

SUPPLEMENT.

The Mining Journal, RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

[The MINING JOURNAL is Registered at the General Post Office as a Newspaper, and for Transmission Abroad.]

No. 2160.—Vol. XLVII.

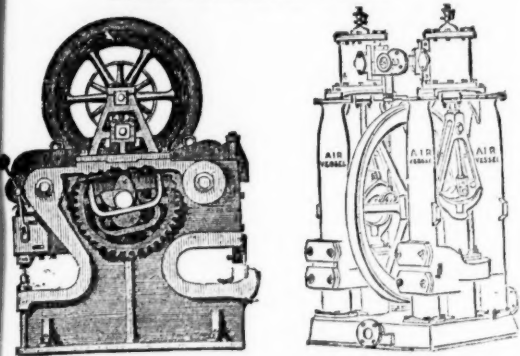
LONDON, SATURDAY, JANUARY 13, 1877.

PRICE (WITH THE JOURNAL) SIXPENCE.
PER ANNUM, BY POST, £1 4s.

JOHN CAMERON'S

SPECIALITIES ARE ALL SIZES OF

Steam Pumps, Shipbuilders' Tools,
BAR SHEARS.
ESTABLISHED 1852.



OLDFIELD ROAD IRON WORKS,
SALFORD, MANCHESTER.

HENRY HUGHES AND CO.

FALCON WORKS,
LOUGHBOROUGH.
Honourable Mention—PARIS and VIENNA.



LOCOMOTIVE TANK ENGINES,

For COLLIERIES, MINERAL, and CONTRACTORS' RAILWAYS, of the best materials and workmanship, always in progress, from 6 to 12 in. cylinders, four or six wheels coupled, for cash, hire, or deferred payments.

For Excellence
and Practical Success
of Engines



Represented by
Model exhibited by
this Firm.

HARVEY AND CO.

ENGINEERS AND GENERAL MERCHANTS,
HAYLE, CORNWALL,
LONDON OFFICE,—186, GRESHAM HOUSE, E.C.

MANUFACTURERS OF

PUMPING and other LAND ENGINES and MARINE STEAM ENGINES
of the largest and most approved kinds in use, SUGAR MACHINERY,
MILLWORK, MINING MACHINERY, AND MACHINERY IN GENERAL.
SHIPBUILDERS IN WOOD AND IRON.

MANUFACTURERS OF

HUSBAND'S PATENT PNEUMATIC STAMPS.
SECONDHAND MINING MACHINERY FOR SALE,
In Good Condition, at Moderate Prices—viz.,

PUMPING ENGINES; WINDING ENGINES; STAMPING ENGINES;
STEAM CAPSTANS; ORE CRUSHERS; BOILERS and FITWORK of
various sizes and descriptions; and all kinds of MATERIALS required for
MINING PURPOSES.

STANDARD LUBRICATING OILS
COMPANY, LIMITED.

DARK and PALE OILS for MACHINERY, RAILWAY, and MINING
PURPOSES, from TWO SHILLINGS per gallon, and upwards.
AGENTS WANTED.

95, CANNON STREET, LONDON, E.C.

ALEX. CHAPLIN AND CO.,

CRANSTONHILL ENGINE WORKS, GLASGOW.

PATENTERS AND SOLE MANUFACTURERS OF

CHAPLINS' PATENT STEAM CRANES, HOISTS,
LOCOMOTIVES, AND OTHER ENGINES AND BOILERS.

LONDON HOUSE:—

McKENDRICK, BALL, AND CO.,

63, QUEEN VICTORIA STREET LONDON E.C.



PARIS,
BRONZE MEDAL, 1875.



ORDER OF THE CROWN OF PRUSSIA.



FALMOUTH,
SILVER MEDAL, 1867.

A DIPLOMA—HIGHEST OF ALL AWARDS—given by the
Geographical Congress, Paris, 1875—M. Favre, Contractor, having
exhibited the McKean Drill alone as the MODEL BORING MACHINE
for the St. GOTHARD TUNNEL.

SILVER MEDAL of the Highland and West of Scotland
Agricultural Society, 1875—HIGHEST AWARD.

At the south end of the St. Gothard Tunnel, where

THE MCKEAN ROCK DRILLS

Are exclusively used, the advance made during eight consecu-
tive weeks, ending February 7, was 24'90, 27'60, 24'80, 26'10,
28'30, 27'10, 28'40, 28'70 metres. Total advance of south head-
ing during January was 121'30 metres, or 133 yards.

In a series of comparative trials made at the St. Gothard Tun-
nel, the McKean Rock Drill continued to work until the pres-
sure was reduced to one-half atmosphere (7½ lbs.), showing
almost the entire motive force to be available for the blow
against the rock—a result of itself indicating many advantages.

The GREAT WESTERN RAILWAY has adopted these
Machines for the SEVERN TUNNEL; the LONDON AND
NORTH-WESTERN RAILWAY for the FESTINIOG TUN-
NEL; and the BRITISH GOVERNMENT for several Public
Works. A considerable number of Mining Companies are now
using them. Shafts and Galleries are driven at from three to
six times the speed of hand labour, according to the size and
number of machines employed, and with important saving in
cost. The ratio of advantage over hand labour is greatest
where the rock is hardest.

These Machines possess many advantages, which give them
a value unapproached by any other system of Boring Machine.

THE MCKEAN ROCK DRILL IS ATTAINING GENERAL
USE THROUGHOUT THE WORLD FOR MINING, TUN-
NELLING, QUARRYING, AND SUB-MARINE BORING.

The MCKEAN ROCK DRILLS are the most powerful—the
most portable—the most durable—the most compact—of the
best mechanical device. They contain the fewest parts—have
no weak parts—act without SHOCK upon any of the operat-
ing parts—work with a lower pressure than any other Rock
Drill—may be worked at a higher pressure than any other
—may be run with safety to FIFTEEN HUNDRED STROKES
PER MINUTE—do not require a mechanic to work them—are
the smallest, shortest, and lightest of all machines—will give
the longest feed without change of tool—work with long or
short stroke at pleasure of operator.

The SAME Machine may be used for sinking, drifting, or
open work. Their working parts are best protected against
grit and accidents. The various methods of mounting them
are the most efficient.

N.B.—Correspondents should state particulars as to
character of work in hand in writing us for information,
on receipt of which a special definite answer, with
reference to our full illustrated catalogue, will be sent.

PORTABLE BOILERS, AIR COMPRESSORS, BORING STEEL,
IRON, AND FLEXIBLE TUBING.

The McKean Drill may be seen in operation daily in London.

MCKEAN AND CO.

ENGINEERS.

OFFICES,

42 BOROUGH ROAD, LONDON, S.E.; and
5, RUE SCRIBE, PARIS.

MANUFACTURED FOR MCKEAN AND CO. BY

Messrs. P. and W. MACLELLAN, "CLUTHA IRONWORKS,"
GLASGOW.

The Warsop Rock Drill

(Involving an entirely new principle in Mechanical Boring)

Requires only 20 lbs. steam or air-pressure.

Has only two moving parts—thus ensuring freedom from de-
rangement, and is absolutely self-feeding.

Is excessively light, and can be carried by one man, who can
with the No. 1 size (weighing only 35 lbs.) drill 40 holes
¾ in. diameter and 1½ in. deep per hour, in the hardest Aber-
deen granite for splitting purposes.

WARSOP AND HILL,

HYDRAULIC AND GENERAL ENGINEERS.

NOTTINGHAM.

STEAM and HYDRAULIC WINDING and PUMPING ENGINES
of all kinds.

DUNN'S ROCK DRILL,

AND

AIR COMPRESSORS.

DRIVING BED ROCK

TUNNELS, SINKING

SHAFTS, AND PERFORMING

OPEN FIELD OPERATIONS.

IS THE

CHEAPEST, SIMPLEST,

STRONGEST, & MOST EFFECTIVE

DRILL IN THE WORLD.

OFFICE,—193, GOSWELL ROAD

(W. W. DUNN AND CO.),

LONDON, E.C.

THE

PATENT SELF-ACTING MINERAL DRESSING MACHINE COMPANY

(LIMITED).

T. CURRIE GREGORY, C.E., F.G.S.

OFFICES,—GLASGOW: 150, ST. VINCENT STREET.

LONDON: 85, GRACECHURCH STREET, E.C.

IMPORTANT NOTICE TO MINE PROPRIETORS.

MR. GEORGE GREEN, ENGINEER, ABERYSTWTH,
SUPPLIES MACHINES under the above Company's Patents for
DRESSING all METALLIC ORES. Dressing-floors having these Machines pos-
sess the following advantages:—

- 1.—THEY ARE CHEAPER THAN ANY OTHER KIND IN FIRST OUTLAY.
- 2.—ONLY ABOUT ONE-FOURTH OF THE SPACE USUALLY OCCUPIED
BY DRESSING-FLOORS IS REQUIRED.
- 3.—FROM 60 TO 70 PER CENT. OF THE LABOUR IN DRESSING, AND
FROM 5 TO 10 PER CENT. OF ORE OTHERWISE LOST, IS SAVED.
- 4.—THEY ARE THE ONLY MACHINES THAT MAKE THE ORE CLEAN
FOR MARKET AT ONE OPERATION.

They have been supplied to some of the principal mines in the United Kingdom
and abroad—viz.,

The Greenside Mines, Patterdale, Cumberland; London Lead Company's Mines
Darlington, Colberry, Nanthead, and Bollyhope; the Stonecroft and Greyside
Mines, Hexham, Northumberland; Wanlockhead Mines, Abington, Scotland (the
Duke of Buccleuch's); Bewick Partners, Haydon Bridge; the Old Darren, Esclair-
mwyn, and Ystumtuen Mines, in Cardiganshire; Mr. Beaumont's W.B. Mines,
Darlington; also Mr. Sewell, for Argentiferous Copper Mines, Peru; the Brats-
berg Copper Mines, Norway, and Mines in Italy, Germany, United States of
America, and Australia, from all of whom certificates of the complete efficiency of
the system can be had.

WASTE HEAPS, consisting of refuse chads and skimpings of a
former washing, containing a mixture of lead, blende, and sulphur,
DRESSED TO A PROFIT.

Mr. BAINBRIDGE, C.E., of the London Company's Mines, Middleton-
in-Teesdale, by Darlington, writing on the 20th March, 1876, says—"The yearly
profit on our Nanthead waste heaps amounted last year to £200, besides the ma-
chinery being occupied for some months in dressing ore-stuff from the mines. Of
course, if it had been wholly engaged in dressing wastes our returns would have
been greater; but it is giving us every satisfaction, and bringing the waste heaps
into profitable use, which would otherwise remain dormant."

Mr. T. B. STEWART, Manager of the Duke of Buccleuch's Mines,
Wanlockhead, Abington, N.B., writing on 20th March, 1876, says—"I have much
pleasure in stating that a full and superior set of your Ore Dressing Machinery has
been at work at these mines for fully a month, and each day as the moving parts
become smoother, and those in charge understand the working of the machinery
better, it gives increasing satisfaction, the ore being dressed more quickly, cheaply,
and satisfactorily than by any other method."

Mr. BAINBRIDGE, speaking of machinery supplied Colberry Mines,
says—"Your machinery saves fully one-half on old wages, and vastly more on the
wages we have now to pay. Over and above the saving in cost is the saving in ore,
which is a much short of 10 per cent."

GREENSIDE MINE COMPANY, Patterdale, near Penrith, say—"The
separation which they make is complete."

Mr. MONTAGUE BEALE says—"It will separate ore, however close
the mechanical mixture, in such a way as no other machines can do."

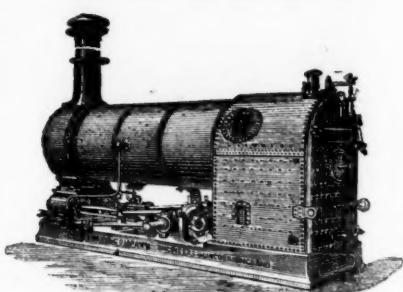
Mr. C. DODSWORTH says—"It is the very best for the purpose
and will do for any kind of metallic ores—the very thing so long needed for dress-
ing-floors."

Drawings, specifications, and estimates will be forwarded on application to—

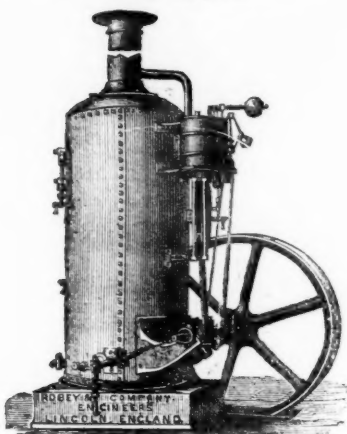
GEORGE GREEN, M.E., ABERYSTWTH SOUTH WALES.

ROBEY & CO., ENGINEERS, LINCOLN,

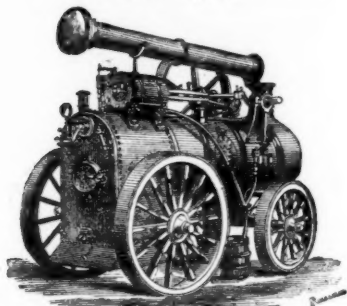
SOLE MANUFACTURERS OF THE



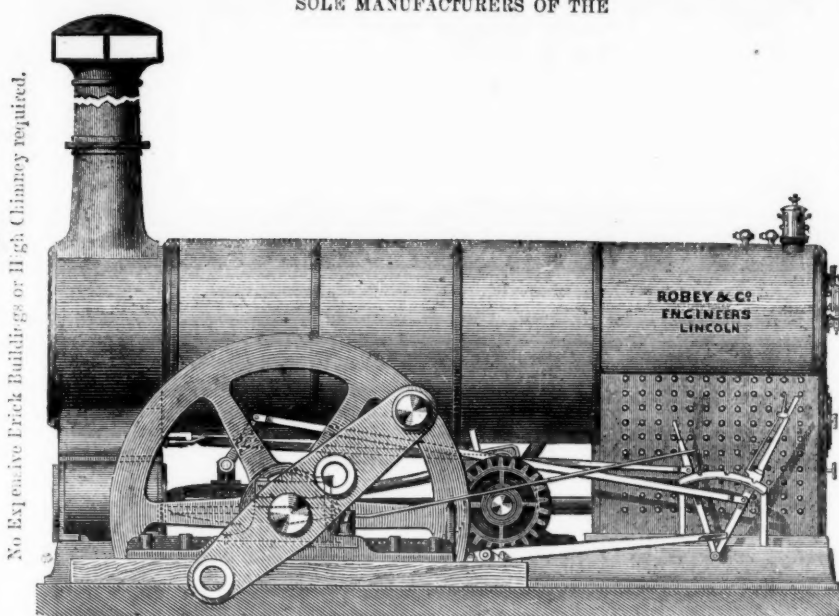
THE PATENT ROBEY FIXED ENGINE AND LOCOMOTIVE BOILER COMBINED, 4 to 50-horse power.



VERTICAL STATIONARY STEAM ENGINE AND PATENT BOILER COMBINED, 2 to 12-horse power.



SUPERIOR PORTABLE ENGINES, 4 to 50-horse power.



PATENT IMPROVED ROBEY MINING ENGINE, OF ALL SIZES, FROM 4 TO 50-HORSE POWER.

Some of the advantages of this New Engine are as follows:—

SMALL FIRST COST. SAVING OF TIME AND EXPENSE IN ERECTING. EASE, SAFETY, AND ECONOMY IN WORKING. GREAT SAVING IN FUEL.

This New Engine is free from all the objections that can be urged against using the Semi-Portable Engine for permanent work, because it possesses the rigidity and durability of the Horizontal Engine, and at the same time retains the advantages of the Semi-Portable in saving time and expense in fixing.

THE PATENT ROBEY FIXED ENGINE

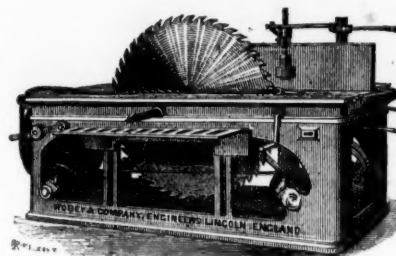
(Also above illustrated) is admirably adapted for driving Rolling Mills, Saw Mills, Brick Machinery, Pumping Machinery, and all descriptions of Fixed Machinery.

ENGINES UP TO 200 EFFECTIVE HORSE-POWER ALWAYS IN PROGRESS.

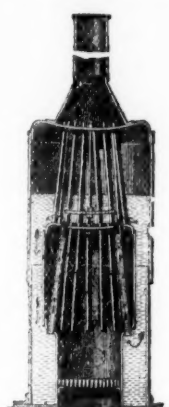
Prices and full particulars of all the Machinery here illustrated on application to the Sole Manufacturers,

ROBEY & CO., ENGINEERS, LINCOLN, ENGLAND.

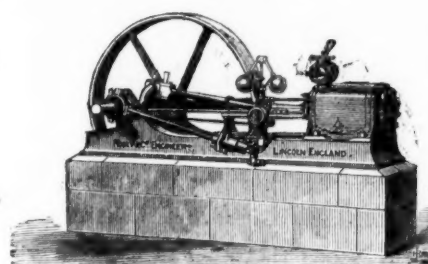
London Office: 117, Cannon Street, London, E.C.



SELF-ACTING CIRCULAR SAW BENCH.



PATENT VERTICAL BOILERS, 2 to 12-horse power.



IMPROVED HORIZONTAL FIXED STEAM ENGINE, 4 to 60-horse power.

PATENT "INGERSOLL ROCK DRILL," LE GROS AND CO.

60, Queen Victoria Street, London, E.C.

5, PARK PLACE, NEW YORK, U.S.A.



We claim 40 per cent. greater effective drilling power, and offer to compete with any machine of its class.

See following extracts from the reports of Judges in awarding Medals:—

"2. Its simple construction ensures durability, &c.

"4.—The steam air cushions at each end of cylinder effectually protect from injury.

"5. Its having an automatic feed, giving it a steady motion, &c.

"6. Its greater steadiness and absence of jar and vibration experienced in other drills, which is very destructive to their working parts, &c.

"7. Its greater power is some FORTY PER CENT. in favour of the Ingersoll."

Medals awarded for several years in succession "For the reason that we adjudge it so important in its use and complete in its construction as to supplant every article previously used for accomplishing the same purpose."

Estimates given for Air Compressors and all kinds of Mining Machinery. Send for Illustrated Catalogues, Price Lists, Testimonials, &c., as above.

THE IRON AND COAL TRADES' REVIEW, ROYAL EXCHANGE, MIDDLESBOROUGH.

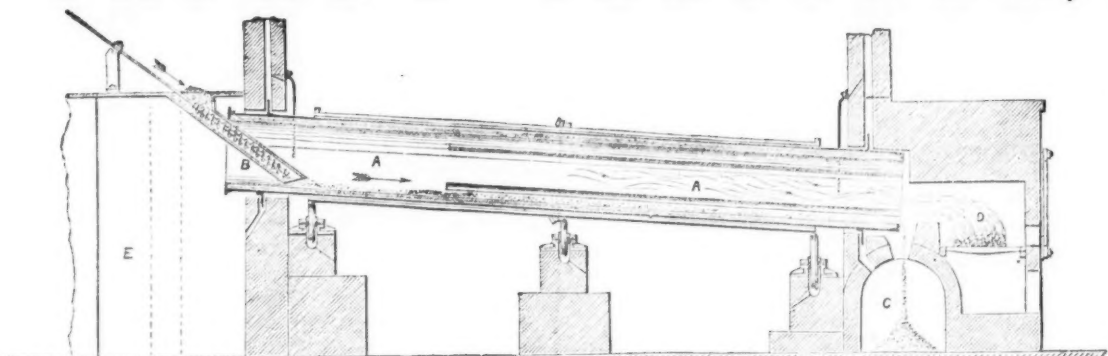
The IRON AND COAL TRADES' REVIEW is extensively circulated amongst the Iron Producers, Manufacturers, and Consumers, Coalowners, &c., in all the iron and coal districts. It is, therefore, one of the leading organs for advertising every description of Iron Manufactures, Machinery, New Inventions, and all matters relating to the Iron, Coal, Hardware, Engineering, and Metal Trades in general.

Offices of the Review: London: 7, Westminster Chambers, S.W.; Middlesborough-on-Tees: Royal Exchange; Newcastle-on-Tyne: 60, Grey street.

Just published, Free Edition. **GUIDE TO HEALTH; OR, ADVICE AND INSTRUCTIONS FOR THE CURE OF NERVOUS DEBILITY.**—A New Medical Work on the Treatment of Local Debility, Consumption, Loss of Memory, Physical Depression, Indigestion, and all diseases resulting from loss of nerve power. Illustrated with cases and testimonials. Sent free for two stamps.—Dr. SMITH will, for the benefit of country patients, on receiving a description of their case, send a confidential letter of advice.

Address, Dr. H. SMITH, 2, Burton Crescent, London, W.C.

OXLAND AND HOCKING'S PATENT CALCINER,



For Roasting Ores containing Sulphur, Arsenic, and other Volatile Matters, have been supplied to some of the principal Mines in the United Kingdom and Abroad.

For particulars, apply to—

Dr. OXLAND, 8, PORTLAND SQUARE, PLYMOUTH; or to Mr. JOHN HOCKING, Jun., TREWIRGIE TERRACE, REDRUTH.

BORING AND SINKING.

WILLIAM COULSON AND SON

Are prepared to UNDERTAKE BORINGS for MINERAL EXPLORATION, either from the SURFACE or UNDERGROUND WORKINGS; BORINGS for WATER SUPPLIES or TUNNEL SOUNDINGS, &c., at fixed prices, according to the size of bore-hole required; also to EXAMINE and REPORT upon the BEST MEANS to SECURE DEFECTIVE TUBBING.

Plans and specifications prepared for Shaft Tubbing, Wedging Cribbs, Pumping, and General Sinking Arrangements.

Address: **W. COULSON AND SON, SHAMROCK HOUSE, DURHAM.**

J. WOOD ASTON AND CO., STOURBRIDGE

(WORKS AND OFFICES ADJOINING CRADLEY STATION).

Manufacturers of

CRANE, INCLINE, AND PIT CHAINS,

Also CHAIN CABLES, ANCHORS, and RIGGING CHAINS, IRON and STEEL SHOVELS, SPADES and FORKS, ANVILS, VICES, SCYTHES, HAY and CHAFF KNIVES, PICKS, HAMMERS, NAILS, RAILWAY and MINING TOOLS, FRYING PANS, BOWLS, LADLES, &c., &c.

Crab Winches, Pulley and Snatch Blocks, Screw and Lifting Jacks, Ship Knees, Forgings, and Use Iron of all descriptions, STOURBRIDGE FIRE BRICKS AND CLAY.

THE CO
In a form
the first el
as published
purports to
the year 18
marce in m
It is remark
review of th
of the metal
ing, and im
trial classes
appropriate
The entire
been valued
showing the
abridged, no
for by the p
which, with
from 1 1/2 to
all that tim
over 1874 is
nection with
that the me
the month l
pared with
needed, of t
The expo
value of 20
30,000,000.
As to the
of them all,
1,750,000. (i
in 1874, but
of the year
against 169,
was entered
in the Briti
812,000, on
year before,
it is as an a
December t
closing mon
blishing wh
lead mining
promising p
Our best o
observing r
1874 by 24,
ported to th
years. The
were value
ber any year
months the
average the
was owing
Turkey. Th
use of the a
value of 51.
likely to ad
tralia show
calved a ton
purchased to
year, as this
but now sho
Tin in blo
the cost of
third of all
figures disp
our market
tin was at t
half a millio
tion that o
retrogression
tion. All o
increase of
most signal.
Of copper
cent more
miner it is n
ber, howeve
Regulus, inc
off of about
pared with
3,112,157;
imports for
in ores, whi
close upon 5
than one-four
all wrought
mines of the
a fall of ove
before. Of
of the figur
factured ma
metal sheet
unfavourable
vance only i
unwrought
and British
many, there
extinct, the
80%. Our pr
the figures b
year, but 12
customer, r
foreign cons
clining trade
power of bo
ceive large
course, muc
factured arti
tin and copp
ticular obse
United State
export was
last year, bu
tions in for
Zinc was
increase of
imported m
gate value
large augme
average one
On the whol
comes more
in the case
entered was
mercant desi
in England
115,730, las
giving more
a long time
The impo
last year, ar

Original Correspondence.

THE COMMERCE OF THE SUPERIOR METALS IN 1876.

In a former Journal we reported the Foreign Trade in Metals for the first eleven months of this year. The Custom House Returns, as published by the Board of Trade, are now available, in what purports to be their amended and corrected form, for the whole of the year 1876, and we are able from these data to review the commerce in metals for that period and compare it with previous years. It is remarkable that such of our contemporaries as have given any review of the commerce of 1876 have omitted to take notice of any of the metals except iron, yet mining for the superior metals, smelting, and imports and exports employ a large number of the industrial classes, and contribute largely to the national wealth. It is appropriate to the *Mining Journal* to supply that omission.

The entire imports of all the commodities for the 12 months have been valued at 374,003,771*l.*, a trifle more than that of last year, showing that the consuming power of the people has not been abridged, notwithstanding the slackness of trade. This is accounted for by the profits of previous years, and by the cheapness of money, which, with the exception of the first fortnight in January, ranged from 1½ to 1¼ per cent. in the open market, with a Bank rate nearly all that time of nominally 2 per cent. The increase of the imports over 1874 is just 4,000,000*l.* Taking these considerations in connection with an increase in the revenue, proof positive is afforded that the means of the people cannot have much deteriorated. In the month last past, however, the imports fell off 3,000,000*l.*, as compared with the final month of 1875, affording proof, if any were needed, of the depressed state of business throughout December.

The exports of British and Irish productions were of the declared value of 200,575,876*l.*, about 23,000,000*l.* less than last year, and 39,000,000*l.* less than the year before.

As to the superior metals, placing lead first as the most steady of them all, throughout the year 1876 our imports were valued at 1,750,000*l.* (round numbers), about an average and rather more than in 1874, but over 54,000*l.* less than in 1875. During the last month of the year this decline wholly occurred; the amount was 109,711*l.*, against 169,717*l.* in the last month of 1875. All the lead received was entered for home consumption. The export value of lead raised in the British Isles—pig, rolled, sheet, piping, and tubing—was 812,095*l.*, only 8000*l.* less than last year, and 18,000*l.* less than the year before, furnishing proof of the accuracy of our statements that it is as an article of commerce the steadiest among metals. During December the worth of exports was 58,088*l.*, 8000*l.* more than in the closing month of 1875, and 21,000*l.* more than in that of 1874, establishing what has been repeatedly asserted in our columns that lead mining and trading in lead is looking up, and that there are promising prospects for investors in mining for this metal.

Our best customer has been China, which took to the value (still observing round numbers) of 226,000*l.*, passing 1875 by 10,000*l.* and 1874 by 24,000*l.* Our next best customer was Russia, which imported to the value of 196,000*l.*, a moderate increase upon previous years. The increase was very large last month, the exports of which were valued at more than 17,000*l.* Russia receives little in December any year, as the Baltic is closed at that season. December 12 months the value was 696*l.*, and in that of 1874 only 303*l.* On an average the Empire imported 34 times her usual quantity. This was owing to the military preparations in view of a war with Turkey. The imports were chiefly received through Odessa for the use of the army in Bessarabia. India imported for the year to the value of 51,379*l.*, a steady increase on previous years, and which is likely to advance as the tea plantations are making progress. Australia shows 48,321*l.*, a falling off, as the building mania has received a temporary check. It is noticeable that the United States purchased to the extent of 29,000*l.*, nearly five times as much as last year, as this trade with the States had been in a declining condition, but now shows decided symptoms of revival.

Tin in blocks, ingots, bars or slabs, and regulus was imported at the cost of 1,148,164*l.*, a decline of over 300,000*l.* More than one-third of all we received was re-shipped to foreign parts. These figures disprove the assertion which still continues to be made that our markets are glutted with foreign tin. The export of British tin was at the price of 396,075*l.*, against 80,000*l.* more last year, and half a million more the year before, fearfully confirming the allegation that our foreign trade in Cornish tin rapidly declines. The retrogression on the last month of the year is in the same proportion. All our customers took less, except France, which shows an increase of over 20 per cent. The decline in the American trade is most signal.

Of copper our imports in value were 926,936*l.*, about 30 per cent more than usual; however unfavourable this may be to the miner it is not so to the manufacturer. For the month of December, however, the comparative review shows a marked decline. Reguluses, including precipitate, answers for over a million, a falling off of about 17 per cent. from last year, but a fair average as compared with other years. Unwrought, or part wrought, figures for 3,112,157*l.*; a general average, but 10 per cent. under last year. The imports for the month in all forms show a decided increase, except in ores, which have declined. The value of copper imports has been close upon 5,000,000*l.* The re-shipments have, however, been more than one-fourth of the imports, amounting to 1,378,373*l.*; they were all wrought, or part wrought. The exports of copper from the mines of the United Kingdom were of the stated value of 2,914,542*l.*, a fall of over 300,000*l.* from last year and 200,000*l.* from the year before. Of these exports unwrought in ingots, cakes, or slabs are of the figure of 968,075*l.*; about the average. Wrought or manufactured made up the sum of nearly 1,000,000*l.*, and mixed or yellow metal sheeting counted for 948,571*l.* The month of December was unfavourable to the trade in British copper, there being a slight advance only in unwrought, the other forms dropping heavily. For unwrought there was a considerable advance in the export to France and British India, but in every other direction, especially to Germany, there was a decrease. As to the United States it is becoming extinct, the value being only 122*l.*; last year, however, it was but 80*l.* Our principal customer for wrought copper was British India, the figures being 339,481*l.*; some 55,000*l.* less, however, than last year, but 120,000*l.* more than the year before. Germany was a good customer, receiving 54,000*l.*—a fair increase; but Russia, our best foreign consumer, although buying 112,000*l.* worth, indicates a declining trade. Turkey and Egypt fell away considerably, as their power of borrowing has ceased, and they were accustomed to receive large portions of their loans in metals and manufactures. Of course, much copper, lead, and tin are exported in the form of manufactured articles composed of various metals, but the direct trade in tin and copper presents an unfavourable year. It is worthy of particular observation that the trade in wrought copper with the United States, like unwrought, has nearly ceased. The value of the export was only 1761*l.*, an increase, it is true, of nearly 450*l.* upon last year, but merely nominal when compared with similar transactions in former years.

Zinc was imported crude or in cakes to the value of 666,234*l.*, an increase of 153,000*l.* over last year, and 174,000*l.* over 1864. The imported manufactures of zinc are unenumerated, but their aggregate value was 411,536*l.*, a slight diminution from last year, but a large augmentation above 1874. The month of December was an average one at the same period of the year for zinc importation. On the whole, these receipts go on with rapid progress as zinc becomes more used here, as it is in France, Germany, and Russia. As in the case of lead so in zinc—there were no “re-exports”—all that entered was for home consumption. Spelter, which is the commercial designation of zinc, wrought and unwrought together, mined in England was exported to the declared value of 130,200*l.*, against 115,730*l.* last year, and 94,000*l.* the year before. Our miners are giving more attention to this metal, but are not likely to raise for a long time to come, if ever, enough to satisfy the British market.

The imports of quicksilver were worth 369,782*l.*, against 666,374*l.* last year, and 841,208*l.* the year before. The causes of this rapid

and severe decline are obscure. The decreased exports to the United States are mainly credited with it, but the substitution of other elements in chemical manufactures and mining operations has its share in the matter. The decline for the month of December, compared with the last month of other years, is very striking. The figures are—December, 1874, 184,120*l.*; 1875, 60,000*l.*; 1876, 12,000*l.* Quicksilver is not found in the United Kingdom, but it is an export merchandise. Last year the value shipped was 237,110*l.*, against 391,461*l.* in 1875, and 652,108*l.* in 1874. This decay of the trade is partly accounted for by the discovery of the metal in America, from whence it is exported to various countries, which received it hence in return cargoes.

The imports of pyrites of iron, copper, and sulphur were rated at 1,208,257*l.*, an average amount, but nearly 200,000*l.* less than in 1875. The month's decline is at the rate of 100 per cent.

The iron trade is far too vast in its dimensions, and its position at present far too critical, to be discussed in an article on the commerce of the superior metals.

If there has been a bad year, yet the prospect is not gloomy if peace be preserved in Eastern Europe. Stocks are low, money was never so cheap, commercial facilities were never so abundant, and there is a general disposition to look forward to a revival in 1877.

MINING IN QUEENSLAND.

SIR.—During the month of September there was forwarded from the Warwick Railway Terminus the following quantities of tin:—

	Tons	c. qrs.	lbs.
Stream tin...	432	0	1 19
Ingot tin...	nil		
This quantity was nearly the same as the previous month of August, and 40 tons more than September, 1875. For the quarter ended Sept. 30 the quantity of tin forwarded from the Stanthorpe tin fields by the same route was as follows:—			
Stream tin...	1132	1	2 14
Ingot tin...	5	4	3 20

Total for the quarter ... 1137 6 2 6
This quantity is nearly 300 tons more than the previous three months, and about 50 tons more than the third quarter of 1875. It shows a decided increase in the production of tin on the Stanthorpe tin field, and all reports speak of the quantities of tin on hand at the different works or mines waiting carriage, variously estimated in the New England district alone at 300 to 500 tons. The actual price of stream tin at Stanthorpe is far higher than it has been for the past 12 months, and unless an immediate rise takes place before the purchases of the past three months get on the London market heavy losses will accrue to the smelters and shippers. I see no prospect whatever of a diminished supply from here, everything points the other way. The more ground is opened the greater is the discovery, and country that was not thought of at the first rush is now turning out enormous quantities of stream tin at a cost of from 11*l.* to 17*l.* 10*s.* per ton. At no part of the world is tin got so cheaply as on the Stanthorpe field at present, but I am sorry to have to report that the smelting operations on the field have ceased. All the furnaces are now out, and Newcastle is doing the most of the smelting, owing to the cheapness of coal there.

In gold our northern fields are turning out enormous yields. The escort from the Palmer now reaches over 10,000 ozs. a fortnight. A new port has been discovered within 30 miles of the Hodgkinson, the richest reefing district yet discovered. Machinery is going up by every steamer, and Northern Queensland bids fair to out rival Victoria in its palmy days.—*Brisbane, Nov. 7.* RESIDENT.

NEW MEXICO, THE FUTURE COPPER REGION OF AMERICA—No. I.

SIR.—The issues of April 1 and July 22 of the *Mining Journal* contain my reports concerning the property of the Maxwell Land Grant and Railway Company, which property forms the most northern part of New Mexico. What is east and west of it is as yet hardly visited by white people, with the exception of a road running west of the main chain of mountains from Santa Fé north into the San Juan country, the only road to that mining district which is passable during winter. The north-west corner of the territory is occupied by the Navajo Indian reservation, and inhabited by a tribe forming with the Pueblo Indians an exception from the general character of the red man. Navajo is and Pueblos, the latter in a higher degree than the former, are an agricultural and industrial people, living in perfect peace and good understanding with the white men.

Before proceeding with my report on the parts so far in contact with civilisation of this territory, I will copy a few passages from a general description of this country and its inhabitants, lately written by a member of the Wheeler Expedition for Harper's Magazine:—

“In most things New Mexico is the antithesis of all other parts of the United States, and is alienated by the language, faith, customs, and education of its people. The early records of the Spanish adventurers who opened the territory to the knowledge of Europe are extinct. The Spaniards had visited the territory over 100 years before the English had landed at Plymouth; and in 1595 it was formally added to the already dazzling possessions of Spain. About one-fifth of the entire population of the territory consists of Indians, and the original Spanish stock has mixed blood in marriage as well as in battle with the handsome Navajos, the brooding Apaches, the treacherous Utes, and the warlike Comanches. In 1846, when the war growing out of the annexation of Texas was in progress, General Kearney took possession of Santa Fé, and soon afterwards conquered the whole territory, which was formally ceded to the United States in 1848 by the treaty of Guadalupe Hidalgo, and reconstructed by the establishment of the territorial government on Sept. 9, 1850; it included at that time a part of Colorado and of Arizona, which were successively separated from it, leaving an area of about 121,201 square miles; its greatest breadth is 320 miles, its greatest length 350 miles, and in acquiring it the United States made citizens of 60,000 impoverished and ignorant people—60,000 people alienated, as I have already said, by language, faith, customs, education, and I might add sympathies, since it is not denied that in event of another war with Old Mexico many of them would be found leaning towards, if not actually engaged on, the side of their quondam compatriots. Though the native American settlers are insignificant in numbers, they control the politics and hold nearly all the important offices among themselves. The principal executive powers are vested in a governor and secretary, who are appointed for a term of four years by the President of the United States. The other officers of state, including an auditor, a treasurer, an adjutant-general, and an attorney-general, are chosen by the Legislature, which consists of a Council of 13 and a House of 26 Representatives. The language of the courts and church is Spanish, and in conversation a *patois* is used, which bears about the same degree of relationship to the mother tongue that the dialect of the Canadian *habitant* bears to Parisian French.

Education is making slow headway; until 1871 there were no public schools in the territory, but there are now no less than 133, with 5625 pupils. In 12 schools both English and Spanish are taught, in 10 English only, and in 111 Spanish only. When the last census was made the population included 48,836 persons over 10 years of age who could not read, and 52,220 persons who could not write. The wealthier classes sometimes send their children to school in the States, but when a young man has tasted the pleasures of Eastern society, he does not willingly submit himself again to the primitive surroundings of his father's house, and hence there is a decided prejudice against this custom. In faith the people are simple, obedient, miracle-loving believers in the most authoritative and absolute Roman Catholicism—blind slaves of crude superstitions. Previous to the acquisition of the territory by the United States their nearest bishop lived over 1000 miles away in Old Mexico, and seldom if ever visited so remote a diocese as this. The priests exercised unlimited temporal and spiritual powers in the several parishes, and were indescribably corrupt in the use of those powers for their personal benefit and the shameful satisfaction of their lusts. Never before was religion further perverted; it became the mere mask of license, and its ministers the priests, not of Christ, but of lechery and greed. At the time when

the present archbishop was appointed he could not close his eyes to the condition of affairs, and summarily dismissed a large number of priests for open immorality; but despite his efforts, which have been sincere and zealous, the Church is still represented in many distant settlements by men who are a disgrace and danger not only to Christianity, but to manhood and freedom. The bishop is a native of France, and most of those under him are French Jesuits, who, while they are not guilty of downright corruption, have not proved themselves in the history of their order the safest guardians of an ignorant people.

The New Mexican is not extravagant in matters of architecture; he is not the man by temperament or inclination to quarry stone and shape it for a shelter when lighter material can be found, and his chief aim in constructing his dwelling has apparently been to succeed with as little labour as possible; his feeble indolence was not likely to express itself in such robust edifices of rock as some of the hardier Indians have left on the cliffs to commemorate their former greatness. Had the sun always shone, and the winds blown steadily from the south, he would not have built at all; but favourable as the climate is, an occasional tornado in summer and snow in winter made the erection of a house a painfully unavoidable necessity. Nature accommodated him, however, and whichever site he chose he had to go no farther than the spot on which he stood for building materials. The earth only needed mixing with a little water and straw to make it adobe. Adobe, in point of fact, is mud, and by spreading it while it is moist over a rude incline of logs, or shaping it into blocks, it can be fashioned without much labour or design into a passably comfortable habitation; this was all that was necessary, and this was all that was done. The two or three square apartments into which the house is divided consist of adobe walls, floors, and ceilings, furnished with a small table, a few kitchen utensils, and a roll of bedding. They have the one merit of being warm in winter and cool in summer, and it would be unfair to overlook their extreme cleanliness, for however filthy a Mexican woman may be personally she invariably keeps a clean house, and is never done scrubbing and whitewashing. Yet poverty-stricken and destitute of other decorations as these rude houses are, the poorest of them can usually boast of a bit of religious finery, and though a chair or a table is not included in the furniture a crucifix dangles over the hearth, and a gaudy print of the Last Supper, the Manger of Bethlehem, or the Madonna and Child may be found hanging against the wall. Another indication of the homage paid by these people to their religion is the presence of a church in the smallest settlements, and whenever the Mexican has risen from the architectural squalor of his squat adobe, his efforts to attain a higher standard have been spent on the edifice that proclaims itself in the cross. In the most distant and impoverished villages a little sanctuary is found raising its head a few feet above the huts around it, and presenting in its belfry and cornice the only attempt at ornamentation visible. The poverty within is almost pathetic.”

So prepared for what the reader would find on visiting New Mexico, I will indicate the ways to get there. Three different railroad companies are actually rivaling to secure the trade from and to New Mexico, by the way of Kansas City to the Kansas Pacific, the Atchafalaya, Santa Fé, and the Denver Rio Grande. The latter (narrow-gauge) has a terminus station at El Moro, only a few miles from Trinidad, and the northern boundary line of New Mexico; this road is driving towards the Rio Grande Valley in order to thus open the San Juan region in Southern Colorado and the best part of New Mexico and Rio Grande Valley at the same time. From El Moro at present a daily coach runs in two hours to Santa Fé, and from there a semi-weekly coach as far as Silver City in the southern part of the territory. There also exists a connection by coach with this line for El Paso, Mexico, where connection is made with the postal system of Mexico.

After leaving the Maxwell grant (Colfax county) the road south passes for a short distance over the free soil of Sweetwater and Rio Ocate valley, but soon enters on land, and remains there for a distance of 60 miles, which, like the Maxwell grant, has been the object of more or less fraudulent transactions, and which forms the Mora, Nolan, and Las Vegas land grants. Las Vegas is the first town met by the traveller, which bears entirely the Mexican character, and even more so than Santa Fé. From Las Vegas, which is south-east of Santa Fé, but which has to be passed in order to reach the mountain passes leading over the Rocky Mountains, the road winds west, and when San José has been reached again turns north-west.

The geological formation of this country is similar to that of the more northern part. The plains are covered with cretaceous strata (*inoceramus*, *prol.*, *gryphaea*, *pitcheri*), including good seams of lignite, bearing all the qualities of a good stone coal. The low flat hills, called mesas, are alluvial debris. The foothills are betraying beyond the extent of the cretaceous also remnants of older formations down to the Silurian, and the peaks are granite, syenite, gneiss, and mica slate, and scattered over a large area are outcrops of trachyte and basaltum, intermixed with less frequent occurrences of brimstone and obsidian. Of useful minerals I here saw only isinglass (mica) in a very handsome occurrence, of a clean and transparent lustre, and available in sheets from 8 by 10 in. down to smaller sizes, but clear of clouds and cracks. I have heard of an Arctic expedition for securing such product lately, but it is a sure thing that with a great deal less time and expense this product can be permanently procured in New Mexico. Those interested may, in applying for it, have all the information they will want about it.

Nearer to Santa Fé the gneiss and mica slate become predominant, and are penetrated by frequent seams of felspar, and on these rocks strata of the carboniferous age are well defined in light beds of lime-rock, rich in fossils, bituminous shale, with *Cordaisia corassifolia* and *Sphenopteris lectifolia*, with coal seams and an underlying red-brown sandstone. At Santa Fé the prairie land begins again, and is interrupted only between this city and the Rio Grande river by single mountain peaks and groups. With these groups begin the region which in some future time will become important for metal production. Until now they are visited only by gold washers, but although gold is found in greater quantity even than in many well-paying placer diggings in California, it is not in the gold where the economical value of the country will be found, but in copper.

Before describing some of the copper deposits, I have to mention still some other geological curiosities and mines nearer, and of less economical importance. The mountain group nearest to and about 20 miles south-west of Santa Fé, is called the Cerillos Mountains, consisting of a series of peaks surmounting the plains, and towards the south connected with other groups—the Old Placer, Puerto, Sandia, and Manzanos. In the Cerillos there is a large massive outcrop of porphyry which shows an enormous amount of work done on and around it by large piles of debris and caved in ground; this is the mine where the Aztec Indians and all tribes succeeding them in this country have dug for the precious stones—the Calchilmité (turquoise), for which this country was so much famed at the time the Spaniards made their first conquest, and from which Charles V. received the two gems, probably still to-day forming part of the Spanish Crown jewels. The mine is caved in, and although small, particles of turquoise of inferior quality are visible among the debris, nothing betrays its former greatness but its ruins.

At not a great distance from this mine, by a road intersected with outcrops of more porphyry, we reach the only mine as yet found in the country which by its development proves that New Mexico has once been a mining country, although there is so little now known to bear testimony of the industries of the last races. This mine, called Mina del Tiro (mine of the shaft), probably because even its real name is no longer known, is the only one really re-discovered, although the country is full of rumours of many others formerly explored, but covered up and hidden by the Indians after they drove the Spaniards back to Mexico in 1680. There are on this mine two shafts—one vertical, about 100 ft. deep, and one, probably the oldest one, consisting of vertical offsets, and in total about 160 ft. deep. There are drifts connecting the shafts, and from the deeper one there are lone drifts on the continuation of the deposit; it is a nearly vertical vein, with large outcrops, showing zinc, blende, galena, and copper pyrites, and by all indications must be a large and regular deposit of these ores. Assays differed from 8 to 32 ozs. in silver to the ton of ore reported to be taken from this mine, when an attempt was lately made to clear the old works, and similar to what is on the debris. The mine

is not worked, and is in the hands of speculators, as all others in the Cerillos group are, none of which show much development.

F. M. F. CAZIN,
Santa Fe, New Mexico. Consulting Mining and Civil Engineer.
[To be concluded in next week's Journal.]

RICHMOND MINING COMPANY.

SIR,—I observe that a correspondent, signing himself "Lex et Lux," has taken notice of my communication of Dec. 28, and has been good enough, in the concluding portion of his letter, to give us some explanation regarding the present extraordinary depression of the Richmond shares; and, as he seems to be behind the scenes in this matter, it would be a great boon to bona fide shareholders were he to give us a hint as to who the parties are who periodically manipulate the shares so cunningly to their own advantage, and to the serious injury of unwary investors. But as this is not the first occasion on which "Lex et Lux," or a correspondent under that title, has by his communication tried to damage the credit of the mine, such a disclosure might for more reasons than one be inconvenient to him.

"Lex et Lux" evidently suspects that my letter emanates either from one of the directors or from someone inspired by them; and being one of those who for purposes of his own gain takes a delight in running the mine down and trying to make people believe that its condition and prospects are utterly rotten, he has thought fit to treat my statements not by sound argument, but by ridicule, which is not argument. I am, however, neither a director nor inspired by them; I am simply what my signature betokens.

He starts by calling my statement that a saving of 10,000, may be annually effected by the new contract rates for haulage of ore from the mine to the works "unsupported and requiring confirmation." Perhaps he is not aware that, thanks to unpardonable blundering on the part of someone in the selection of the present site for the smelting works, the company has hitherto been paying the amazing sum of \$24 for the haulage of every ton of ore brought to the works for smelting. I presume that he knows that a contract has lately been made for the next five years to deliver the ore from the mine at the furnaces for \$14 per ton, which gives a saving of \$10 per ton. Now, the furnace returns furnished us show that the following have been the quantities of Richmond ore annually smelted:—In 1874, 28,165 tons; in 1875, 31,906 tons; in 1876, 36,759 tons; total, 96,830 tons—i.e., an average of 32,276 tons yearly, an amount which has been worked up by an average of three furnaces only; for though there may have been four—and lately even five—furnaces at the works, so frequently have these had to be re-lined, especially during the earlier years, that one can only reckon three as the average number all the year round. This gives 10,758 tons per furnace yearly, which at the present rate of working is considerably under the mark, but sufficiently near for my purpose. Let me next remind "Lex et Lux" that a large hydrocycle will shortly be added to our strength. It has reached the works—if, indeed, it is not, as I write, at work. Thus we may reckon on at least four furnaces running continually for the future out of the six. This additional furnace will work up at least another 10,758 tons of ore. Add this to the amount smelted by the three other furnaces, and we have 43,034 tons of ore required annually from the mine, which, at \$14 per ton saving, will give a sum of \$53,790, or even more than the 10,000, which I predicted.

I may observe, *en passant*, that after the fashion of correspondents who try to run our mine down, "Lex et Lux" would insinuate that there is a doubt whether we shall get the same amount of ore in the future as in the previous years. Of this there can be little fear, seeing we were lately informed that there was more ore coming from the mine than the furnaces could smelt. Neither is it likely that a man of Mr. Probert's shrewdness would get up a sixth furnace if he saw a chance of there being no ore to smelt in it. Depend upon it Mr. Probert and Mr. Potts know pretty correctly the vast stores of mineral contained in the workings on the west side of the hill, and yet more in the "Potts Chamber," and it would be well were the Chairman to acquaint shareholders with what the measurements of this last-named chamber are, so that they might calculate for themselves the splendid bonanza which they possess, instead of leaving them to be terrified by "Lex et Lux" and gentlemen of his persuasion into the belief that their mine is being fast "played out," and hard pressed for ore.

The next of my statements which is assailed is the one relative to the saving by fuel. I had to speak in the indefinite way I did because I am not in all the secrets of the management, although I do occasionally hear from outside parties what is going on, and I happen to know that two most favourable offers are open to the board in respect to cheap coke, either one or other of which if accepted would bring about the saving which I stated.

"Lex et Lux" seems to have misunderstood me when I used the word "coke." He evidently refers to charcoal, I to coke from coal, of which, although considerably dearer than charcoal, a large proportion is used in the furnaces, the smelting power of coke, as compared with that of Eureka charcoal, being as 8 to 5, or 1.6 to 1. Thus, as we are likely to have coke at far cheaper rates than we have hitherto been getting it, it looks more likely that the charcoal burners will have to reduce their prices, not raise them, and I suspect they have not yet forgotten the lesson they were once before taught by "the little person," who is quite equal to them and their combinations. We must, however, be grateful to "Lex et Lux" for the valuable information he has given us regarding the threatened combination, and I sincerely trust that our board will, if not already acquainted with it, take due notice of it, and use the knowledge to foil the schemes of the plotters.

It is a notorious fact all over California that the unhappy Richmond is plundered right and left, and made to bleed in every possible way by the "cute Yankees," who say that had they the mine in their possession (it being the best mine in the country outside the Comstock bonanza) they could make it pay \$2, or 10s., a month on the \$50 share, whereas we receive (and that only of late) but 7s. 6d. in the quarter. The fact is well known and openly talked of in San Francisco and Eureka that the only people who do not get rich on the mine are the poor shareholders. Well will it be when this state of affairs is stopped! It may be difficult to do so entirely; but much may be effected by the shareholders agitating and looking more into the affairs of their mine, rather than leaving it entirely in the hands of the board, who again are too much in the hands of their very self-willed brother at Eureka. But for the healthy discussion and the disclosures forced upon the shareholders by the doughty Mr. Aston, who would not be put down or silenced, at the meeting which took place in December, 1875, where should we now have been? That discussion and those disclosures showed the owners of the property in what a critical position it was, and resulted in the raising of debentures and the abstaining from dividends for the space of a twelvemonth, and eventuated in the present undoubtedly prosperous condition of our company. Now, this question of cheap fuel is one of the very greatest importance, and one which shareholders will do well to take up and impress upon the board, and yet more so, through them, on Mr. Probert, with whom rests the making of all contracts for fuel.

The consumption of coke and charcoal combined amounts annually at our works to the enormous quantity of 12,000 tons, for which we pay the ruinous prices of, I believe, \$60 per ton for coke, and \$34 per ton for charcoal, at which figures if we assume that one-third, or 4,000 tons, of coke are consumed, against 8,000 tons of charcoal, our annual expenditure in fuel alone is 102,500, or if coke and charcoal be burnt in equal proportions 112,500. Surely it is worth while trying to bring about a saving in this enormous expenditure? I assert that a very large saving is possible if our board will but exert themselves, for I am aware of an offer for a contract to supply English coke having been made as far back as July last, which would effect the saving I stated in my last letter—nay, even more but for the extravagantly heavy carrying contract rate of \$8 for 85 miles per ton, conceded by our managing director at Eureka for the carriage of our coke, &c., along a portion of its journey. Why this very favourable offer has not been paid any heed to the shareholders will, I trust, demand of their Chairman at our next meet-

ing, if not even earlier, for it is needless to point out that a saving of 20,000, represents another 7s. 6d. dividend, and the question is one which all who read this letter will, I trust, acknowledge deserving of the gravest consideration, and the sooner it is discussed the better will it be for our interests.

That portion of "Lex et Lux's" letter commencing "large returns were promised about August, and were above the average for five or six weeks, during which the shares advanced. Since when a much less average has ruled, with the whole of the furnace power worked up to its maximum," and ending "we have now before us all the hindrances and drawbacks of a Nevada winter, and the risks attending large excavations in the limestone formation" is only worthy of notice in that it may do what it is intended to do—alarm the timid and deceive the ignorant.

Had I but the *Mining Journals* of those months to refer to I should like to reply fully to the first mentioned remarks; but as they are not available I must trust to memory. Still, I do not think I shall be far wrong in stating that shortly after Aug. 19, when the weekly run was \$70,000, and was followed up by runs of \$65,000 the shares began to drop in price until about Sept. 7, when the run being still as high as \$65,000 (more than double what it was in the week ending Sept. 11, 1875, and twice and a half times that of Sept. 4, 1875) the shares were sold for 8s. Much about which time the "bears" and certain interested parties, by a supreme effort and the publication of pamphlets loaded with the grossest falsehoods, succeeded in driving down the shares to about 7s. and 8s.—a fact which clearly shows that it is not as "Lux" would have us believe, the consideration of the runs or the condition and prospects of the mine, but the machinations of speculators and jobbers which really affect the prices. Were not this the case the shares would not to-day, when the prospects of the mine were brighter and its position stronger, be quoted at 8 to 8½—a price which they nearly commanded at a time when we were told we must give up all idea of dividends for 12 months to come, and were 127,000, in debt to our bullion agent, in lieu of, as at present, with a large balance at our credit.

As to the runs having gone up to \$70,000 for a week or two, and then receded to \$55,000 and \$50,000, or so, the reason I am told is this—that Mr. Probert having gone away on short leave the smelters, in lieu of taking the ore as it came, and as were Mr. Probert's orders, amused themselves by selecting the best ore and passing that through the furnace—a practice they had very soon to discontinue after it was discovered. To this and not the cause alleged by "Lux" may be attributed the much lesser averages. The remarks regarding the drawbacks of a Nevada winter, and the risks attending large excavations, are hardly worth noticing. Every one is aware that work is more or less hindered during the winter months; but there is no greater hindrance to be expected this winter; nay, far less, for we are to have a railway ready by this date from the mine to the works; and as to the risks of running through limestone, it is difficult to see what bearing they have on the present question as they must always exist, and are nothing new.

Southampton, Jan. 11. AN OLD AND LARGE SHAREHOLDER.

THE RICHMOND CONSOLIDATED MINING COMPANY.

SIR,—I think I can explain why it is that the Richmond shares have lately fallen in value. Unfortunately, the value of securities on the Stock Exchange does not depend on their intrinsic value, but only on the law of supply and demand. Should a holder of (say) 500 mining shares in which there is but a limited market find it necessary for any private purposes to realise them, if there should at the moment only happen to be purchasers on the market for 400 shares the dealers will with the 100 shares extra supplied to the market depreciate their value for two purposes—to get them as low-priced as they can, and to frighten other holders into selling, so as to get other shares. Immediately these shares are sold the prices resume their normal quotations.

This is the cause of the present fall, as I am given to understand some shares have recently been placed on the market to cover an advance. Since last summer the shares have been repeatedly knocked up and down from about 10½ to 8, and each time they have quickly succeeded in recovering themselves, and so they will at the present time. To warrant a low price the most outrageous reports are spread about. In last week's *Journal* the re-lining of the furnaces was made to take up the greater part of the month of January. We have a parallel case in the month of January, 1875, when the furnaces were re-lined. The returns for the previous month (December) were \$230,000, and for the month of January, during which all three furnaces were re-lined, they were \$185,000, showing only a falling off of \$44,000 by the re-lining of the furnaces. The fact is only one furnace at a time is re-lined, and that takes about a week. As to the value of the mine, the highest returns hitherto had were for the half-year ending February, 1875. The returns for four months and one week in January were \$774,000. This year for the same period they are \$921,000, an increase of nearly \$30,000. The profit that half-year was \$80,000. The shares in January of that year were 7½; in July 15. It is quite true they have been working a lower grade ore lately, but last week's report shows that the stopes are in one of very good quality. The value of the mine is not to be determined by one or two weeks' returns, but an average for months.

SHAREHOLDER.

MINING IN NEWFOUNDLAND.

SIR,—A few years since a large amount of correspondence was published in the *Mining Journal*, pointing out the large field which existed in Nova Scotia and Newfoundland for the profitable employment of English capital, yet I have not observed that anything material has been done to develop any Canadian mines, although millions have been thrown away, and still continue to be wasted on the mines of the far west of the United States. Upon analysing your Share List I notice that not a single American mine has returned the capital expended upon it (I am, of course, speaking only of those owned by English companies), and, with the exception of two, all have entailed a larger percentage of loss upon the shareholders than the much maligned Emma. Sweetland Creek has reimbursed the shareholders nine-tenths of their outlay, but this is assuming that they are content to receive no interest in the meantime, for it is reported that the mine is so nearly worked over that if they get the remaining 10 per cent. they will be fortunate. Yet this is a mine ably and honestly managed, and which has suffered less than some from the dealings of market operators. The Sierra Buttes has done the same, and is still prosperous. The Richmond comes next, having reimbursed the shareholders 69 per cent. without interest of their outlay.

Excluding these three mines the returns of the American mines have not given the shareholders one year's ordinary interest between them, and this is without mentioning the twelve American mines still in the non-dividend list and likely ever to remain there. Birdseye Creek has returned but 14s. on each 4s. share during all the years it has been in existence; Cedar Creek, 5s. on 5s.; Chicago, 2s. 8s. on 10s.; Colorado Terrible, 13s. 6d. on 5s.; Eberhardt and Aurora, 1s. 5s. on 10s.; Emma, 3s. 12s. on 20s.; Flagstaff, 4s. 2s. on 10s.; Gold Run (hydraulic), 2s. 4d. on 14s.; Last Chance, 14s. on 5s.; London and California, 1s. on 2s.; Mammoth Copperopolis, 5s. on 10s.; Mountain Chief, 4s. on 10s.; and South Aurora, which has, I believe, exchanged its American mines for others in Italy, 14s. 2d. on 5s. These returns are all that the shareholders have to compensate them for many years loss of interest upon their investments and for unceasing anxiety.

Now, the Colonial mines whenever they have been worked by British capitalists have given far better results than these—the Burra Burra has returned 70s. for each 5s. invested; the English and Australian, chiefly a smelting company, 2s. 18s. 9d. for each 2s. 10s., and now in fine working order; the Cape Copper, 26s. 15s. for each 7s.; and the Scottish Australian returning 17½ per cent. per annum regularly. The Newfoundland mines will prove as valuable as any in Australia or South Africa, and the Swansea ticketing returns for the present quarter will satisfy anyone that money is to be made there. During the last three months the Betta Cove Mine sold in round numbers 16,000, worth of ore, and the Union Mine, almost the only other mine in Newfoundland which has been developed,

received 5000s. for the output of the same period. The importance of these figures, 21,000s. for the two Newfoundland mines, will be better understood when I say that the 46 Cornish and Devon mines which sent ore to market during the same time, received but 61,000s. between them, and of this South Caradon received 13,000s. and Devon Great Consols 9200s., but no other English copper mine came near the lowest of the Newfoundlanders. The two Newfoundland mines yielded more than one-third as much as the whole of the copper mines of the western counties, and excluding South Caradon and Devon Great Consols the 44 remaining mines received in the three months but 38,800s. between them, or an average of but 88s. apiece. Yet in the face of all this the Newfoundland and Nova Scotia mines are neglected by English capitalists, who thus miss the opportunity of obtaining a fair return for their money in British dependency, though they freely scatter it abroad. Let some one who is acquainted with the mineral deposits of the provinces of Newfoundland and Nova Scotia take the trouble once more to point out the attractions which they offer for enterprise and I believe that in the altered state of feeling an appeal for capital to work them extensively will not again be made in vain.

London, Jan. 9.

TERRA NOVA.

HOW TO WORK CORNISH MINES.

SIR,—Now that mining appears to be in the rear it seems to be the more necessary that every effort should be made to restore it to its proper position. In talking of metallic mining it must be admitted that Cornwall has taken the lead of all districts, one reason being its long standing, while the various kinds of metal found there enables them to become thorough miners in every detail. Cornwall also affords facilities for acquiring a knowledge of mining machinery for there is abundance of water to contend with, and various kinds of machinery required for pulverising and washing the different ores; so that if we cannot find first-class miners and mining engineers in Cornwall there is little encouragement to seek them anywhere. But where is Cornish prosperity now? It is true they have deep mines that have paid well, and mineral is still there to make paying mines for many years to come if capital were brought to bear; open them out properly, but I fear capitalists are not to be found.

Some little time since I wrote you on the propriety of having straight shafts always, whether perpendicular or on the course of the lodes, that either skip-roads or railroads should always be used for hoisting or keeping the mines clear of stuff. This is the very serious objection now to working the deep mines in Cornwall. To shafts, nineteen out of twenty, throughout the county are started on the hanging side of the lode, and striking the lode at various depths, from 10 to 150 fms. from surface, then turning at severe angle to sink on the lode. If mining companies wish to win the deep Cornish mines profitably they must first go to work and make straight shafts, after that their deep mines can be made to pay well, but taking into consideration the very expensive work of straightening these shafts in many places it is the capitalist's policy to explore virgin ground. This has for many years been neglected, but unless the shafts of the deep mines be straightened, and other improvements made, virgin ground opened out, &c., Cornish mining instead of improving will continue to decline; and what is still more discouraging to witness is that at the present day in mines in Wales under Cornish management shafts are started on the hanging side of the lode, sunk perpendicular, of course, till they strike the lode, and then turn at a wretched angle to sink on the lode. Now, I fail to see the benefit of sinking a shaft, or shafts, from surface for from 5 to 150 fms. perpendicularly and then turning on to the course of the lode, to say nothing of the very ruinous way it places the mine in for discharging the stuff.

Turning from this to the subject of drilling the holes in the mine by compressed air, I find that great praise is given to Capt. Josiah Thomas, of Dolcoath, but what has he done during the last four or five years in the way of improvement? He has a rich mine, plenty of funds in the treasury for experiments, and the full confidence of his employers, being thus quite unlike many of his neighbours. Now, as Capt. Thomas has charge of so many mines in his neighbourhood, and seeing just now the propriety of economising in every manner possible to make the mines pay the stockholders for their outlay, and give the poor working miner a livelihood, allow me to suggest that Capt. Thomas take a trip over here to Lake Superior to view the mode of mining, and the kind of machinery used for pumping, hoisting, and stamping, and if he is, as I believe him to be, a man fit for the position he holds, he could return to Cornwall, and put in practice in his mines great improvements, many of them such as have not yet been thought of in Cornwall.

As to the air-compressed drills, they have been in use here for the last four or five years, and I am glad to be able to say that the first successful result was under the supervision of Capt. Johnson Vivian late of Camborne, Cornwall. It was he who introduced the drill into the Schoolcraft Mine some five years ago with great success. He is now superintendent to the Franklin and Pewabic Mines, close to this place, where he has some half-dozen of these drills drifting and stopping over and under hand at about one-third the cost of hand labour, and I can assure you that the manner in which the rock is handled, the short time occupied from the time the stuff is blasted out till it reaches the stamps, and the manner in which it is stamped and 1 per cent. copper stuff is dressed up to 80 per cent. for copper, leaves nothing to desire. Indeed, I am sure it would handsomely pay both Capt. Josiah Thomas and Capt. William Teague, of Tincroft and Carn Breia Mines, to make Capt. Vivian a visit, and the companies they are connected with could well afford to pay their expenses. Oh, poor Cornwall! After having a constitution to live for hundreds of years, why would you die of so trifling a complaint as now afflicts you? Is there no baln or physician to be found? A MINER.

Portage Lake, Dec. 22.

THE MINING INTERESTS FOR THE YEAR 1876.

SIR,—Of the varied interests associated with our metallic productions not much that is satisfactory can be recorded. The year 1876 opened and closed and remained throughout one continued course of stagnation, both as regards commerce and industry, the lack of enterprise, the reluctance to speculate, added to actual losses incurred through gigantic failures of individuals and firms, coupled with defaulting states and countries, generated universal distrust which culminated in general inanity at all the centres of commerce both at home and abroad. Hence speculative enterprise of the type witnessed for the three years ending with 1874 became absolutely extinguished, and still remains of that hand-to-mouth character which, though safe to investors, cripples in the bud that *esprit et couleur de rose* necessary—nay, indispensable—to stimulate action throughout moneyed circles, so as to find employment for brains and the sinews of enterprising intellects, and the industry of the masses. The revelations before the Foreign Loan Committee of the House of Commons in reality caused the heavy losses to English investors, which they first created and that have since taken place. Argentine fell from 84 to 59 per cent.; Austrian, 66½ to 54; Danubian, 105 to 81; Egyptian Seven Per Cent. 79½ to 50; ditto 1873, 71 to 50; Hungarian, 73 to 56; Peruvian, 34 to 18; Russian Five Per Cent. 1873, 98½ to 78½; Santa Fé, 106 to 73; Spanish, 18 to 14½; Turkish Six Per Cent., 27½ to 14; ditto 9 per cent., 41 to 20. Other foreign stocks and securities have greatly depreciated in value, and the money subscribed to all of these communities have left this country, created properties and industries in which we at home do not participate, and raised the calibre of the foreigner to compete with us in the products of industry, and in the commerce of the world.

The mining interests of this country suffer from a variety of conflicting elements. It is true that wages have been reduced, and fuel has been obtainable on moderate terms, but the world does not buy our iron and steel on any approach to former scales, and English ironmasters have had the mortification of being undersold by foreign makers, and their goods ejected from one market after another, while home consumers have in many cases given preference to the products of Belgium and France to those of Staffordshire and Durham. In respect to these industries it may, however, be added with

truth that E...
ation in the...
but the ques...
sition end, a...
facture retu...
capital and e...
In respect...
yielded 13s. 6d...
1s. 6d.; Gun...
1s. 7s.; Gun...
West Chiver...
88½, 6l. 15s...
Gravels, 7l...
Orogwin, 1l...
minster, 1l...
Dyflife, 4l...
Company of...
Prince Patri...
4s. 6d. per sh...
The tone of...
ing—the iron...
production i...
warfare betw...
the Conferen...
exist still...
these rival c...
necessity of...
to gain, to r...
That induc...
public recog...
months is re...
lished fact...
from the lat...
occasion—i...
lets, is the...
hold out eve...
Sl, Bishop

SIR,—A "A" in one partic...
other. If he...
the "sweepi...
n mines we...
wrote was th...
and legiti...
properly bro...
stances as al...
I applied...
companies a...
capital, and...
the sharehol...
ferred to ha...
eve of succe...
—engines ar...
and take ad...
thing from...
tions, and h...
pump out th...
altogether...
The mines...
tained to de...
new compar...
prices," they...
the old com...
present com...
hand and pe...
15,000, for...
tion, and is...
stood in the...
40, would b...
Of course...
Consols at c...
1000, in 17...
the public v...
per share, 1...
PS.—A "A" I did not pu...
fisted Ameri...
if I had? I...
M.P.'s whos...
I should ha...
publicly de...
my advice...
a hornet's n...
ments whic...
caution.

SIR,—It is...
system of a...
directors of...
we find that...
by people w...
and it is on...
that we find...
of ten thou...
and who ve...
likely to be...
are placed...
failure inst...
would be a...
What I w...
of a public...
divided int...
would be cl...
2d. Profess...
practical w...
would sugg...
be chosen f...
be properly...
rangers wou...
directly res...
I shall en...
or two of t...
first place...
directors w...
bilities inc...
names of th...
of good fai...
ties of whi...
Besides thi...
financial d...
everything...
confirm the...
many cases...
dional direc...
and should...
might be a...
There are...
cient time...
there are a...
in the prim...
the sort of...
with an ill...
the hands...
(say) of cl...
class men i...

truth that England possesses the power and ability to beat all opposition in the long run, and even to create and annex new markets, but the question in doubt at present is when will this state of transition end, and our iron trade in its varied manipulation and manufacture return to its normal condition? The conflicts between capital and labour have crippled the industry, and we fear strikes must end ere we start on a basis of permanent improvement.

In respect to metallic mines for the year 1876, Dolcoath, 107.14s.10d., yielded 17.10s. dividend; East Pool, on 9s. 9d. per share, yielded 13s. 6d.; Glasgow Consols, 20s., 2s.; Great Retallack, 57.18s. 6d.; 16. 6d.; Gunnislake, 54. 5s.; Marke Valley, 57. 2s.; South Caradon, 14. 7s.; South Condurrow, 67. 5s. 6d.; 9s. 6d.; Tincroft, 97. 20s.; West Chiverton, 124. 20s.; West Poldice, 107. 8s.; West Tolgus, 95. 6d.; 15s.; Eliza Consols, 207. 6d.; Van, 47. 5s.; 37. 6s.; Roman Gravel, 77. 10s.; 25s. 6d.; Great Laxey, 47. 2s.; Tankerville, 67. 17s.; Grogwin, 27. 2s.; Alderley Edge, 107. 5s.; Duchess of Westminister, 17. 2s.; East Darren, 327. 2s.; Foxdale, 257. 10s.; Great Dyllife, 47. 2s.; Lisburne, 187. 15s.; 27s.; Minera, 57. 22s.; Mining Company of Ireland, 77. 3s. 6d.; North Hendre, 27. 10s.; 2s. 6d.; Prince Patrick, 20s., 1s. 3d.; Bryn Alun, 87. 7s.; Wye Valley, 37. 4s. 6d. per share.

The tone of manufacture and of home industry is decidedly hardening—the iron centres are more active, and the future of this staple production is certainly more encouraging, while the dread of active warfare between Russia and Turkey is fast subsiding. Even should the Conference end without accomplishing its proposed objects there exist slight doubts of the most vital questions at issue between those rival countries being arranged between themselves without the necessity of a “duel at arms.” Russia is too weak, and has too little to gain, to risk the chances of open conflict, isolated from other powers.

That industrial enterprises at home will materially advance in public recognition and adoption with February and the spring months is regarded by practicals in well informed circles as an established fact, and we think the truism often quoted as emanating from the late Sir Robert Peel peculiarly applicable to the present occasion—i.e., to buy in the cheapest and sell in the dearest markets, is the soul and essence of success. Hence mining properties hold out every inducement to investors to embark.

81, Bishopsgate-street, Within. R. TREDINNICK,
Dealer in Stocks and Shares.

REVIEWING REVIEWS.

SIR,—A “Cautious Man” seems to have misunderstood my remarks in one particular, and to have slightly misrepresented them in another. If he refers to the review he will find that I did not make the “sweeping remark” that “with the exception of Dolcoath other tin mines were not conducted in a legitimate manner.” What I wrote was this, “Excepting Dolcoath, which is conducted in a proper and legitimate manner, I question if many others have their accounts properly brought up.” The three mines that a “Cautious Man” instances as also well managed he will find also referred to in the review.

I applied Mr. Murchison's remarks to mines under limited liability companies abandoned not from poverty but from the exhaustion of capital, and the impossibility under the Act of getting more out of the shareholders. In this unfortunate way the mines I specially referred to had to be stopped and liquidated when apparently on the eve of success, and new companies took them up as going concerns—engines and machinery complete—and with new capital to work and take advantage of the former outlay. This is a very different thing from taking up old mines, such as your correspondent mentions, and having to lay out 10,000, or 20,000, on machinery, to pump out the water, &c., and then to find “old men's tales” a myth altogether, or very much exaggerated.

The mines I referred to made good returns of lead, and some continued to do so even during liquidation and the formation of the new companies to work them, and so far from now selling at “high prices,” they are at a heavy discount. For instance, Rookhope under the old company stood at 57. per share, or 75,000, for the mine; the present company, in a better position and with a large capital in hand and paying its way, stood when I wrote at 17. per share, or 15,000, for the mine! Pandora made large returns during liquidation, and is also much lower in price than formerly. Clementina stood in the market at 15,000; is now in 125 shares, which even at 40, would be only 5120.

Of course it would be a very nice thing to get into a Devon Great Consols at cost price; but even here, a few gentlemen only put down 1000, in 17. shares to open out an old pit, and when the ore was found the public who purchased shares had to pay from 300, up to 800, per share, 17. paid.—Jan. 8. J. Y. WATSON.

PS.—A “Cautious Man” also says it is much to be regretted that I did not publicly use “energetic language” in denouncing the “inflated American Mines” of 1874. But what would it have availed if I had? The public would still have had faith in the lords and M.P.'s whose names appeared in prospectuses in the daily press, and I should have been simply overwhelmed with abuse, as I was for publicly denouncing the same sort of thing in 1852. No one asked my advice privately without having it, but I saw no reason to raise a hornet's nest around my own head in publicly denouncing statements which from their very extravagance should have excited caution.

PROFESSIONAL DIRECTORS.

SIR,—It is worth while, I think, to consider whether the present system of appointing directors might not be modified so as to admit directors of an entirely different stamp. In all private undertakings we find that the business of the firm, whatever it may be, is managed by people who are thoroughly acquainted with the work in hand, and it is only when we come to the business of public companies that we find their affairs conducted by men who in nine cases out of ten know nothing whatever about the practical part of the work, and who very often have had no experience whatever of a nature likely to be of value to them in the circumstances in which they are placed. The consequence is that we too often find complete failure instead of the success which in an ordinary partnership would be almost a certainty.

What I want to suggest is that instead of the whole directorate of a public company being chosen as at present the board might be divided into two distinct classes.—1st, Financial directors, who should be chosen from among the shareholders as at present; and 2d, Professional directors, whose duties would be to attend to the practical working of the company's business. These directors, I would suggest, need not necessarily be shareholders, but they should be chosen for their special knowledge of the business in hand, and be properly remunerated for their services. The manager or managers would take their instructions from them, and they would be directly responsible to the shareholders.

I shall endeavour, in as few words as possible, to point out one or two of the advantages of an arrangement of this kind. In the first place, it would do away with the present difficulty in procuring directors willing to qualify themselves and take all the responsibilities incidental to the floating of a new undertaking, because the names of the professional directors would be a sufficient guarantee of good faith, and there could not then be any suspicion that practices of which everybody has heard more or less were being repeated. Besides this the shareholders would be able to appoint their own financial directors, instead of as under the existing plan having everything cut and dried for them, and only being called upon to confirm the appointments already made by the promoters, and in many cases not even so much as that. The appointment of professional directors should, I think, be approved by the shareholders, and should then be held subject to such notices from either side as might be agreed upon.

There are able men connected with every business who have sufficient time at their disposal to devote to an office of this kind, and there are also men who retire from the active duties of their trade in the prime of life, and to whom such a position would afford just the sort of employment they require. I will conclude my remarks with an illustration. Suppose the case of a colliery passing into the hands of a joint stock company, composed for the most part (say) of clergymen, retired officers, and others who, although first-class men in their particular spheres, hardly know a coal mine when

they see one. Two or three gentlemen from such a proprietary might easily be found quite capable of attending to the financial affairs of the concern, but if they took in hand the direction of the various details of the work they could not possibly expect anything but failure. On the other hand, if this duty were delegated to (say) three or four gentlemen of practical experience they might safely reckon upon their affairs being carried out in a manner satisfactory to themselves and their co-shareholders, and the cost as compared with the result would not be worth considering, because it would be merely the price of success as against almost certain failure.

Cornwall, Jan. 6.

LOOK OUT.

LEAD MINING IN SHROPSHIRE.

SIR,—Observing in the *Mining Journal*, which reaches me here, that owing to the enhanced price of lead increased attention is being paid to lead mining, I would avail myself of this opportunity to bring before the notice of gentlemen wishing to promote a *bona fide* undertaking a really deserving and valuable lead property. The mines in question are situated in a rich district in Shropshire, adjoining and being under the same ownership as the justly celebrated Roman Gravel Mines. They have been remaining idle, from easily explained reasons, for the last ten or twelve years, but previously to their stoppage yielded ore during some months by private enterprise to a greater extent than the Roman Gravel Mine, which has paid since the organisation of the present company about 80,000, in dividends, has yet attained to. The geological formation is identical in both, and the rich courses of ore worked down to the deepest level, at about 90 fms. from surface, only require to be followed in further depth by adequate pumping machinery to ensure a corresponding, or even greater, success. I shall be happy to reply to any communications on the subject addressed to me to the care of the Editor.—*Constantinople*, Dec. 25. EDWARD GLEDHILL.

THE ARSENIC TRADE.

SIR,—Your correspondent, “Nemo,” states that the highest price which could be obtained for a quantity of arsenic soot did not exceed 87. 7s. 6d. per ton in any part of the year 1875, and in February of that year a mine was “paid off” for good quality soot at a little over 57. per ton. Your correspondent is either wilfully misleading the public or knows nothing whatever about what he is writing. In February, 1875, the best arsenic soot at West Seton was sold for 67. 10s. per ton, and in the following month South Wheel Croft soot was sold for 107. 2s. 9d. per ton, both by tender, and the buyers paid the carriage from the mines to their works; many other parcels were sold during the year between 87. and 107. per ton, a large quantity at the highest price, and where the buyer had to pay upwards of 10s. per ton carriage.—*Jan. 10.* TRUTH.

MINING INSTITUTE OF CORNWALL.

SIR,—I take the liberty to suggest that there be added to the resolutions of Dr. Foster and Mr. Pike, for the government and protection of managers of mines, “a code of honour,” which shall be binding on all managers of mines who are members of the Institute, and also on those who are not members—that when a manager of a mine is dismissed, or his services dispensed with, without any cause or reason whatever, no member of the “code of honour” shall be allowed to succeed such discharged managers. Members and non-members of the Institute may not fear the losing of their situations, but they little think how soon their turn may come. Good conduct, ability, honesty, practical and scientific knowledge, and long experience, is no protection whatever against the new law which has been introduced by the shareholders in some mines, and which, contrary to the Roman, divine, or English law, condemns an innocent man in the absence of witnesses, or any proof of wrong doing. Who, then is safe? The man who succeeds a manager thus treated deserves to be “tarred and feathered.” A driver of a sand cart is in a more independent position. A SHAREHOLDER IN MINES.

Dublin, Jan. 9.

WHEAL GRENVILLE.

SIR,—In my letter of Dec. 5, commenting upon the Chairman's reflections upon the former management at the last meeting of the shareholders, I remarked that “by-and-bye the present managers may do that which the old managers may say they would not have done.” Owing to the heavy rains the water has lately increased in the mine, and I have seen a circular issued by the committee saying that they have deemed it prudent to stop the engine to prevent any accident to the underground machinery. Now, this the old managers would not have done, nor would they under any circumstances have taken such a step without first calling the shareholders together. Under the old management the water has risen to a few feet of the 120 fm. level, and yet the then agents mastered the difficulty, and never received a vote of thanks from the shareholders for doing so. At each general meeting under the present management the executive have received a most cordial vote of thanks for their efficient conduct of the affairs of the company, and yet when a little extra water flows into the mine they are at their wits ends what to do, call in, as I am informed, the advice and opinions of no less than five other agents and an engineer, and finally stop the engine, which they call protecting the underground machinery. The late agents would have looked upon this step as calculated to risk the loss of the pitwork, and as virtually the abandonment of the mine, because once completely filled with water the mine, in all probability, could not be drained again except at an outlay which neither the value of the pitwork nor the prospects of the mine might warrant. I trust that if operations at the mine should be resumed, the committee at the future general meetings will have the good sense to drop all further reflections upon the former managers. JOHN WATSON.

Jan. 10.

MINE AGENTS.

SIR,—“Justitia,” in his remarks on the qualification and duties of mine agents, intends probably to refer to agents engaged in foreign mines. He can scarcely mean to adopt the system at home, as it would have the effect of doing away altogether with the practical assayer, dialler, and engineer, and the whole of these qualifications would be concentrated in the acute personage he so glowingly describes to the astonished minds of practical men. “Justitia,” in the exuberance of his liberality to the scientific agent possessing all knowledge in mining, would give him the remarkable salary of 147. per month, a sum about equal to that which would be considered a fair remuneration to a qualified mine carpenter or pitman leaving his home for a foreign land. LIVE AND LET LIVE.

Jan. 10.

MINE AGENTS.

SIR,—Your correspondent, “Justitia,” in last Saturday's *Journal*, has set intending mine agents a heavy task. They are to learn surveying, assaying, mineralogy, geology, &c., in addition to the instruction given in common schools. I never did put much confidence in a “Jack of all trades,” and I am tolerably sure that all the sciences indicated by “Justitia” will not be acquired in perfection, or near perfection, by any miner who is destined for mine agency; nor do I believe that it is expedient to rely on any agent for the exercise of all those qualifications. You may as well expect a man to be a carpenter, mason, smith, and painter as to expect an agent to do all the work which appertains to the different professions in use in mines. Besides, a mine agent has not time to devote to all the subjects, however qualified he may be. An assayer is required, in a large mine, all his time where the returns are large; and, as to surveying, it should be done by a surveyor, because the agents can be of more service to the company by attending to other work properly within their province. If a miner has opportunities it is well to learn surveying and assaying, as in the absence of professional surveyors and assayers he might find such acquisitions useful occasionally.

It is contrary to fact to say that mines cannot be managed well by agents who are deficient of a knowledge of the sciences named, because we know that the best mines in Cornwall are well managed without the managers being possessed of more than a common edu-

cation—it may be the three R's only in addition to the practical knowledge possessed by all good miners. Look at Carn Brea, Tincroft, Cook's Kitchen, Dolcoath, &c., for examples of good management, by men of little learning in the sciences. It has been generally found that the persons who profess to know all the sciences named are of little service in a mine, and show great ignorance in practical application to mining business. We will suppose that a mining company light upon a man who, they suppose, knows everything about surveying, assaying, mineralogy, geology, &c., and that they rely upon him in all respects. He sinks a shaft, erects a steam-engine, drives levels, keeps all the accounts, and pays the men. There is no check. He expends 10,000, or 15,000, before he is suspected of dishonesty or ignorance. Then an investigation takes place, and the result is that there is no lode in the mine, and that hundreds of fathoms of ground never driven have been paid for, and then the agent runs away to avoid exposure in a court of law, and dies! Such a case occurred in Cornwall a few years ago. If the work of conducting that mining affair had been in several hands the roguery would have been prevented, and the loss to the company also.—*Jan. 8.* R. S.

MR. MURCHISON, AND THE MINING INTEREST.

SIR,—I have known Mr. Murchison for very many years, and have had constant opportunities of witnessing his wonderful energy and perseverance, and also the great ability and tact which he invariably brings to bear on the carrying out of any undertaking he has been associated with. I was, therefore, much pleased to see the letter of your correspondent in last week's *Journal* recommending that a substantial testimonial should be presented to Mr. Murchison. Very few of those whose merits are thus acknowledged deserve one so much. Mr. Murchison has been an extensive and famous writer, both on mining and political subjects, and his pamphlet on British Lead Mines published last year has been of great benefit to the mining interest of this country. But Mr. Murchison is also known as an able politician, and I would suggest that a testimonial might at any rate partly take the shape of a fund to pay his expenses in gaining a seat in Parliament at next election. He would be a good representative of our most important British industry. I shall be glad, through you, to receive communications on the subject.

Jan. 11.

S.

MURCHISON TESTIMONIAL.

SIR,—I am glad to see a testimonial proposed to Mr. Murchison for his services in supporting legitimate British mining. No one deserves such a thing better than he does, for no one has done so much good in this respect as he has. I shall with pleasure contribute my mite as soon as I know where to send it.

City, Jan. 11.

AN OLD SHAREHOLDER IN BRITISH MINES.

LEAD MINES.

SIR,—The present price of tin is such that to ask a capitalist to invest in a tin speculation would be regarded almost as an insult. But the same cannot be said of lead mines, the price of that commodity being fair, and not fluctuating like that of tin. I have been induced to write this note from the recollection of a suspension a year or two ago of a lead mine in Perranzabuloe, called Phoenix Mine, which, I believe, resulted from the death or failure of a very large shareholder, which threw its affairs into liquidation. The machinery was purchased by Capt. R. Pryor and Mr. F. W. Michell, C.E., Redruth, with a view to resuscitation, but Capt. Pryor, I suppose, has been too much engaged in New Consols, &c., to enter upon the work. The engines and all appliances are in perfect order for immediate operation, and the lode is such as should encourage any capitalist to take up the mine. Depth about 70 fms.

Jan. 8.

R. SYMONS.

A CURIOUS ENTRY.

SIR,—The Burial Register of the parish of Breage, Cornwall, contains the following:—“Thomas Epsey, senior, of Chilchampton, parish of Bath and Wells, in Somersetsheere, he was the man that brought that rare invention of shooting the rocks, which came here in June, 1689; and he died at the ball, and was buried at Breg the 16th day of December, in the year of our Lord Christ, 1689.” The name of the mine at which he died is not given, but I think it must have been Wheal Vor or Great Work. It is remarkable that he died so soon after the introduction of his invention, and at the mine, too. As he died at the mine I suppose it was by accident, possibly by shooting the rocks!

City of Truro, Jan. 1.

R. SYMONS.

CORNISH MINES SMELTING THEIR OWN TIN.

TO THE EDITOR OF THE WEST BRITON.

SIR,—It must be a source of great satisfaction and encouragement to those who hold shares in Cornish mines, and are not living in the county, to observe that efforts are being made to enable our tin-producing mines to compete with other countries, and that shareholders in this county are again turning their attention to smelting their own tin, and, unless I am mistaken, the long-talked of project will be long assume a determined and practical form. A little earnestness and energy on the part of our leading mine managers (especially those who are unfettered by merchants and committees) would undoubtedly ensure the success of the movement, and now we have an institute originated, I believe, for the sole purpose of discussing questions that may tend to benefit Cornish mines (and surely this question is of paramount importance), perhaps some of those agents that are in favour of it, and I know there are a few, will give us a paper on the subject at one of our coming meetings, and no doubt it will receive the attention and discussion that it deserves, and agents will quickly discern whether it is practicable or not. For my own part I have carefully thought the matter over for some time past, and, with my present information, can come to no other decision than that it would result in large profits to the miners who adopted the scheme, and, for the benefit of those who have not yet given the subject any consideration, I would submit the following particulars:—

Supposing a mine sold 20 tons of black tin, the produce of which was 13 net, this would realise at the present standard (call it 727.) about 467. 15s. per ton. Now, if this 20 tons of tin was smelted it would produce 13 tons of metal, which, at 77. per ton, would give 727. 10s. on the 20 tons as a margin for smelting, and certainly if a mine produced 50, or as in some cases, 100 tons per month, the margin for costs in reducing the ores into metal would be to correspond with this amount. Thus a mine that sold 100 tons of ore per month if it smelted its own tin would produce 65 tons of metal, which would leave a profit of about 3627. per month to meet the expenses of smelting. I, therefore, think it would be a great advantage for our miners to smelt their own tin, and if there should arise the least difficulty or expense in erecting a smelting works I do not know why some of our mines that adjoin each other could not combine, and if they could not overcome at least mitigate the difficulty. In such times of unparalleled depression it behoves everyone connected with the mining interests to use every effort to enable us to contend against foreign competition, and unless this is done, Sir, you may rely we shall be defeated in the struggle. I trust this will induce someone more able than myself to take up the question.

Camborne.

W. H. RULE.

[For remainder of Original Correspondence, see to-day's *Journal*.]

At Messrs. Dabenhams, Tawson, and Farmer's sale of properties at the Mart on Tuesday the 16 lots offered were all sold; amongst them were freehold ground rents amounting to 1167. 19s. 6d. a year, secured upon 29 houses at Cambwell, which realised 32557., or just 25 years' purchase. Shares in the London and Westminster Bank (207. paid) were sold for 637. 10s. each, ex-dividend.

HOLLOWAY'S PILLS AND OINTMENT.—No one should treat the present changes in the weather with indifference, for they undoubtedly have a great effect upon the human body. It is necessary for every one to be cautious and watchful; caution as regards clothing and exposure, and watchfulness as regards the effects on the body. The skin, nervous system, and breathing organs often suffer severely, as is evidenced by erysipelas, rheumatism, cold, sore throats, &c. When, therefore, symptoms of any of the above diseases show themselves they should be at once attended to. The ointment should be rubbed into the parts affected, and the pills taken according to the printed directions; this treatment soon eradicates the disease and restores the general health.

A petition has been presented to the High Court of Justice for the winding-up of the National Co-operative Builders and Contractors' Society.

IRON AND HARDWARE IN ENGLAND AND FRANCE.

The Associated Chambers of Commerce of this country have recently been investigating the rate of wages, hours of work, cost of living, and other matters connected with manufacture in France, particularly with regard to the hardware trades of Birmingham and Sheffield, and a very interesting report has been made by Mr. Frederick Brittain, who was sent over to make the necessary enquiries. In the first place he very properly enquired into the iron manufacture, iron being the raw material for the principal articles of hardware, and he concludes that so long as the present high duty upon it is maintained there is little hope of any reduction in the duties upon its products. The great secret of the success and prosperity of the French workmen, as compared with the discontent and poverty of their brethren in England, is discovered in the sobriety and frugality of the former, and the intemperance and carelessness of the latter. The French workman receives 20 per cent. less wages than the Englishman, and the cost of living in the two countries differs but little. In stating these facts Mr. Brittain merely confirms what was stated by both the American and the English Commissioners to the Exhibition of 1855 and 1867, and it is much to be feared that so long as this striking difference in favour of the French workmen continues the revision of tariffs will be powerless to bring about the desired change. The reports of the French Mining Department give the average wages earned by the men employed in all the coal pits and iron mines in France as being from about 1s. 9d. to 2s. 4d. per working day of about eleven hours.

Among the men at the ironworks of Terrenoir there is, Mr. Brittain states, little drunkenness, and it would be difficult to find a place where there is more intense application to work. The wages for 12 hours a day vary from 2s. 6d. for labourers, to 7s. 8d. and as much as 12s. per day for puddlers. Nature, he says, has done little for Terrenoir, but the directors and the sobriety and industry of its workmen have enabled it to maintain successfully a competition with more favoured rivals. Almost the whole of the ore smelted there comes from the South of Spain, and from Bona in Algeria, the cost of carriage alone exceeding 17. per ton; moreover, the coal used is bad and dear, costing about 11s. per ton. At another ironworks he found the wages of the preceding six months to average 3s. 6d. per day of 11 hours. In the machine shops at Lille the wages paid are 2s. 2d. per day for labourers and 3s. 4d. to 3s. 9d. per day for mechanics, the time of labour being 66 hours per week. In Yorkshire the men work 54 hours per week, and receive from 20 to 25 per cent. more wages. In the neighbourhood of St. Etienne a large number of those articles are produced which form the staple trades of Birmingham and Sheffield, such as anvils, vices, fire-arms, nuts and bolts, files, tools, and building ironmongery; and from enquiries Mr. Brittain found that at St. Etienne, Chambon, Firminy, and the neighbourhood the wages are from 2s. 10d. to 4s. per day of 11 hours. The time is nominally 66 hours per week, but much loss is occasioned by drunkenness, which is far more prevalent in St. Etienne than in any other French town, though the manufacturers assert that there is a complete absence of the vice in the large well-organised establishments, where the workmen are under a kind of paternal discipline, the chief object of which is to promote the desire to acquire some real property. At Beaucourt, Haut Rhin, Messrs. Japy employ 5500 hands, constituting, as at Creusot, a city by themselves, and manufacture watches, clocks, nuts and bolts, wood screws, padlocks, pumps, tin-plate ware, locks, and many other articles of ironmongery. The wages average for men 3s. 4d., and for women 2s. 8d. per day for 12 hours in summer and 11 hours in winter.

In the least favourable cases in the iron and hardware trades English workmen earn 20 per cent. more in nine hours than French workmen do in eleven, twelve, or thirteen hours, and in a large number of cases the difference equals 50 per cent. It is not usual in France to close factories on Saturday afternoon; on the contrary, at many places the men work from Monday morning till Sunday at noon, or later—a fact which should be well considered by those who wish the English Sabbath desecrated by the opening of museums and other places of amusement. The French workmen usually live upon very frugal fare, and in some towns seldom eat meat. Comparing the relative advantages of the workmen of the two countries, Mr. Brittain finds that the margin between the expenditure necessary to maintain a workman in good health, and the amount he receives in wages is very much larger in England than in France. An Englishman who submitted to the hardships endured by the French would be able to save four times as much out of his earnings as the latter. The secret of the wonderful prosperity and wealth of France is to be found chiefly in the sobriety, frugality, and untiring industry of its artisans and agricultural labourers, who usually succeed in saving something out of their very small wages. During the epoch of commercial activity which followed the Franco-German war the manufacturers and the working men in England and France pursued two different systems. In England the colliery proprietors took advantage of the opportunity to raise their prices prodigiously, the ironmasters followed, and a general very heavy augmentation took place in the prices of articles made of iron. At the same time the workmen were able to obtain increased wages, in order to maintain which they manifested a desire to restrict production by diminishing the hours of work. The steel melters of Sheffield refused to work more than two rounds on Saturday, and the consequence was deplorable waste. While coke cost 40s. per ton the manufacturers saw their half-used crucibles thrown upon the rubbish heap, although the third round would not have cost half so much time, or half so much fuel, to produce as the first. Sheffield goods were urgently required for every market in the world, and it would have been difficult, by dint of the greatest industry, to supply the abnormal demand, but, unfortunately, English artisans declined to reap the golden harvest, and lost an opportunity that may never return. The conduct of the French was entirely different. Although the prices of coal and iron were affected by what took place in England, the augmentation was not relatively great, and, while some of the English workmen were seeking how to keep down production, the French were toiling with redoubled energy, and gaining an entrance into markets where they will be henceforward our redoubtable competitors.

The facts so carefully collected, and ably put forward by Mr. Brittain, show beyond the slightest question that a protective policy has secured an important and increasing prosperity for France, whilst the free trade policy has not only prevented improvement in England, but is absolutely depriving her of the proud position she so long occupied. Mr. Brittain shows that the weight of the exports of iron and hardware from England decreased from 1,844,655 tons in 1869 to 1,668,265 tons in 1874, whereas the exports from France of similar articles rose in the same time from 30,466,394 kilogrammes to 133,511,875 kilogrammes. There was not even the nominal increase of production in England at the time of the greatest prosperity, from 1870 to 1872, and in 1873 the decline had already begun to be seriously felt. The present position of the iron and hardware trades is entirely without precedent in its history. From 1840 to 1870 there was a steady advance, but from 1871 to the present time there has been a falling off, which has become more and more important in each succeeding year. It had been imagined that the great reduction in duties would open the French market to English iron and other productions, but events soon proved that French makers only required the stimulus of competition to compel them to adopt improved methods of manufacture, and so to extend their production that they soon required no foreign aid to enable them to supply their domestic demand, and successfully compete with, and sometimes exclude, us from foreign markets. But the real cause of this is neither the greater sobriety nor the greater frugality of the French workmen, but the abandonment by the majority of English manufacturers of all attention to quality; whilst formerly an English brand was almost a guarantee that the article bearing it was the best that could be produced it is now little more than a caution to the consumer that extra vigilance must be used to see that the quality is even passable.

Mr. Brittain says that the only article of Birmingham or Sheffield make that appears to have met with decided success in France is iron tubes, and it is to be feared that the extravagantly high duties still imposed upon them will encourage the creation of a manufac-

turing interest which will in the near future clamour for protection. These duties represent in some cases 40 per cent. of the value, and will, if not reduced, eventually destroy the trade now done by English makers with France. While French manufacturers have been protected by high import duties they have been stimulated by an ingenious system of premiums upon export. Under an *acquit-à-caution* a maker of iron goods at St. Etienne could obtain a *pouvoir* to import duty free the iron which he required for his export trade, but he frequently found that English iron cost him at St. Etienne a higher price than French iron, so he disposed of his *pouvoir* to a speculator, who again sold it to an iron merchant in or near a seaport town, where English iron was cheaper than French. A regular traffic was carried on in these *pouvoirs*, and their prices publicly quoted. During the years 1867-69, 219,594 tons of pig-iron were imported, duty free, under these *acquit-à-caution*. The *acquit-à-caution* represented really a direct premium paid to French manufacturers of iron goods.

The enormous increase in our imports of silks, satins, and kid gloves since the duties on them were abolished, and of wines since the reduction of 1s. per gallon, is noticed by Mr. Brittain, and he shows that whilst the aggregate exports from France to the United Kingdom increased from 17,826,000l. in 1861 to 46,720,000l. in 1875, the imports of British home produce into France only rose from 8,895,000l. in 1861 to 15,357,000l. in 1875, so that while the former figures show that the exports nearly trebled, the latter show that the imports of British produce less than doubled. In 1875 the value of the wine, kid gloves, and silks imported from France amounted to 14,553,152l., whereas the value of all British produce exported to France, excluding coal, was 13,740,000l.; including coal, 15,370,000l. Mr. Brittain admits that great consideration should be shown to the French people, who are so sedulously and energetically repairing the disasters of a great war, but he maintains that the sensible reduction of duties which prevent or restrict importation would not cause the French revenue permanently to suffer. This is, of course, a question upon which Frenchmen only can give a useful opinion but it is one which is at least worthy of their attention.

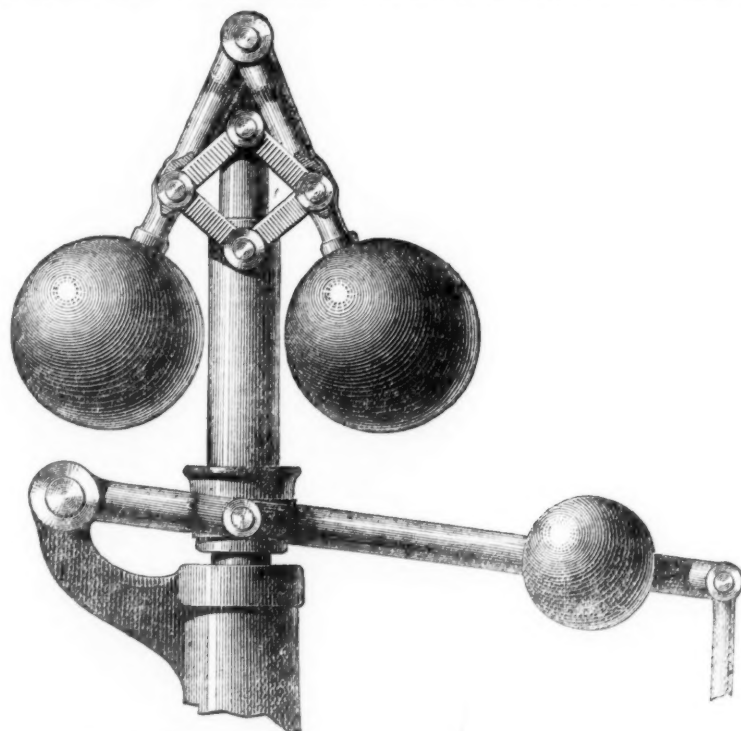
Mr. Brittain points out that, under her system of treaties, which which was inaugurated in 1860, France has built up a gigantic trade, and promoted wonderfully the interests of the entire nation, and he concludes by observing that the sinister predictions of those who opposed the treaty have not been realised—instead of poverty, France has found wealth; the trades which were supposed to be doomed to destruction have, under the stimulus of competition, made a progress which emphatically contradicts all the gloomy prognostications of alarmed monopolists. It is impossible to conceive the disaster that would befall France if England went back to the duties which were in force in 1859, or imposed the same duties upon French produce that France imposes upon English. It is free trade in England that has made the wealth of France, for it is here that she has found a free and magnificent market for all her diversified produce. Although we have reason to ask that the future tariff of France shall be more consistent with the principle of our own, we have no cause to regret the past. The treaty has been a magnificent success. It was the first great step in the direction of free trade. It has given France an immense stake in commerce and manufacture, and it has supplied facts and figures in favour of free trade from which the most stolid ignorance can find no appeal. It has convinced practically a vast number of Frenchmen, whom theories failed to reach, that their happiness and prosperity have been promoted by the change which they were taught to believe would bring about their ruin.

COMPOUND ENGINES.—A recent invention of Mr. JOSEPH SIMPSON, of Manchester, consists in placing the said cylinders parallel to and in close proximity to each other, the cylindrical or other valves for admitting the steam from the high-pressure to the low-pressure cylinder are placed near each end of the cylinders, consequently very little steam is wasted in steam passages, the piston-rod of the high-pressure cylinder is connected direct to the crank on the crank shaft, and the piston-rod of the low-pressure cylinder is connected to one

arm of an elbow lever, the other arm of which is connected by a rod to the same crank, by this arrangement the crank is helped over the dead centres in the same manner as when two cranks are placed at right angles on the same crank shaft. He also claims the application to his present invention of his improved cut-off valve motion and his hydraulic accumulator. In condensing-engines, whether single or compound, he introduces a supplemental condenser, which he brings into operation after the main volume of steam from the cylinder has passed to the usual condenser. The passage leading thereto is closed by means of a valve and the communication between the cylinder and the supplemental condenser is opened, by which means the refrigerating or cooling effect of the common condenser upon the cylinder is wholly or greatly prevented, and the small quantity of steam or vapour remaining in the cylinder is received by the supplemental condenser, which at suitable intervals is also opened to the common condenser by means of a suitable valve, thereby renewing its vacuum in readiness for the next stroke of the piston. The object of this supplemental condenser is to preserve the heat contained in the condensing cylinder and thereby to economise steam.

COMBUSTION OF FUEL.—It is well known that during the combustion of liquid hydrocarbons in an open vessel a large amount of solid carbon is evolved, so much so that any vessel placed over the flame would speedily become thickly coated therewith, and so prevent the transmission of heat into the interior of such vessel. Now, the improvements of Messrs. RAMSDEN and KEIGHTLEY, of Ilkley and Bradford, consists, firstly, in the method by which they secure the complete combustion of these hydrocarbons, and so produce a flame perfectly free from smoke, and intensely hot; and, secondly, for the apparatus by which they produce such results, and by reason of which they are enabled to utilise the heat produced. They take a vessel (say) in the shape of a cylinder, though it must be understood that size and shape will vary in accordance with purpose required, and for a few inches at the bottom of the vessel they place sharp siliceous sand or other suitable crystal. By means of a pipe passing through the side of the vessel they saturate and keep saturated the said sand or crystal with some or one of the liquid hydrocarbons. Laid on the surface of the sand, or fixed in some convenient part of the cylinder they place a coil of piping, which is perforated with minute orifices. When the hydrocarbon with which the sand is saturated is ignited it at once gives off a large quantity of smoke and soot, but immediately steam is turned into the perforated coil small jets of steam issue with great force from the minute orifices, and mixing with the hydrocarbon flame cause all smoke and soot to cease, and a beautiful clear flame is the result. In a short time the heat is such that the steam is decomposed, and then a most intense heat is generated, which is applicable to a large variety of purposes. As before stated, shape and size of vessel will be determined by the purpose for which the heat may be required; for example, in the singeing of manufactured goods or yarns a pipe must be fixed horizontally and half filled with sand, as described for the cylinder, and which said sand must be kept saturated with hydrocarbon, as before described, and perforated pipes applied for conducting the steam. A slit or opening must be made in such horizontal pipe, out of which one continuous flame from end to end of slit will pass out, and by a proper application of the steam jet the flame will be of such purity that the most delicate fabrics may be singed thereby. Or the flame may be caused to impinge upon a silver plate fixed at some short distance above the slit, which plate will soon become at a white heat or high temperature equally all throughout (a desideratum of great importance in singeing); of course, the plate referred to may be of other metal, but for cleanliness and quick transmission of heat they prefer silver. In the melting or purifying of metals the apparatus can be somewhat of the shape of a reverberatory furnace, save like when used for the purpose of generating steam, but the shape of the apparatus will necessarily be subject to variation in accordance with the purpose for which the heat may be required, and in all cases it will be necessary in order to secure complete combustion of the gases generated that suitable apertures are provided for the due admission of air when and where required.

IMPROVED STEAM-ENGINE REGULATOR.



IMPROVED STEAM-ENGINE REGULATOR.

The greatest recommendations which a regulator can possess are simplicity and sensibility, and both of these properties appear to be possessed in a considerable degree in the governor invented by M. MICHAEL ANDRADE, of Paris, of which the above is an engraving. It will be seen that the governor is composed of three parts, the first of which consists of the ball levers, or suspending rods, to which the balls are attached; the second, of connecting arms forming a lozenge or diamond; and third, of a weight or sleeve. The upper apex of the lozenge or diamond is fixed or centered on the axis of the governor or regulator, and the lower apex is allowed to move. The other two or lateral apexes work in slots or openings in the suspending rods. The distance from the point of junction of the suspending arms on the axis or spindle of the governor or regulator should be equal to the sides of the arms forming the lozenge or diamond. The sleeve or weight is applied to the lower apex, and can be worked either directly or by the intermediary of a lever. Speed is varied by varying the position of a counter weight placed on the lever, or a variable counter balance-weight may be employed. Instead of the weight or sleeve a spring may, of course, be used when preferred.

The invention gives mathematical demonstration that the apparatus is practically isochronal by assuming an imaginary governor identical to the preceding, but in which the action of gravity on the balls would be destroyed without the centrifugal force being

altered, and he remarks that an apparatus of this kind would be obtained by placing the balls in equilibrium, and he shows that if the equilibrium exists for a certain position of the system it will exist for all others, supposing the speed of rotation does not change. He then goes on to explain by a numerical example taken from a governor, the working of which is very satisfactory, that the variation of speed which results from the variable term may be dispensed with; and, moreover, that the absence of absolute isochronism contributes to give the governor greater stability. The mathematical formulae are, of course, inadmissible in a newspaper, but Mr. Ernest de Pass, of Fleet-street, through whom the patent has been obtained, and who has the disposal of it, will, no doubt, supply all particulars to those interested.

It is explained that in the imaginary isochronal governor considered in the formulae, when the sleeve is displaced under the influence of the variation of the speed the force which acts on it remains constant as far as this variator remains constant. In the greater part of isochronal governors when the relative equilibrium is destroyed the sleeve is in one direction submitted to a constantly increasing force, and in the other or contrary direction to a constantly decreasing force; it, therefore, results that when it is displaced in the first direction it becomes generally loose, whilst the displacement in the second direction is often effected too slowly. It is to this property and also to the balls of the governor not being in equilibrium that the inventor attributes its stability, and results appear to justify his opinion.

Some very
denser form
of Kirby-st
In an improv
due to the co
facture of fu
or liquid sup
pression. Su
covery of the
any thermom
its compress
a liquid that
apply the lib
And that s
ficiency of the
In obtainin
ration is con
poss and wh
or liquid sat
with saturate
of any series
deliver the p
pressed as s
the pump-ro
in the ordin
to connect th
perforated o
put the inter
terior of the
making the
washers wh
with the th
When all
washers, wh
other suitabl
the end of t
and by mea
external air
one of these
by giving a
either a g
enormous co
the steam c
pumps, and
(for the pur
pression) be
the copper
of the tubes
motion wit
is manufact
the pump i
or other pu
the whole of
tion to be c
the pump, a
of saturatin
the law befo
in a comple

STEAM-EN
PNEUMATIC
apparatus
hydraulic p
facture of s
applicable
similar use
sizes of suc
cost than he
to employ
a suitable c
connected t
the top fra
suitably at
scribed fur
are set sup
trix is sup
by four, m
dent is hel
adjustable
the matrix
outer edge
small auxi
but are adj
to them by
able to giv
to shape a
to the hea
being form
for flange
box tube p
of the boi
more sepa
means he l
and sizes
each class
plunger w
plungers
bottom fra
water is d

IMPROV
W. WALL
a want wi
say, to pr
and other
plished by
at present
nation wi
ground p
used in p
"slip" he
ground fo
mineral, l
other fire
required i
a pugging
ing of the
rial may l
those now
about the
But may l
And if he
ble to bak
advisable
cal produ
In the ma
purpose
for the fi
same. Th
ing bricks
required
bago. In
may be d
—red-lea
carbonate
glazing p
where the
these slip

PUMPS AND CONDENSERS.

Some very extensive claims in connection with pumps and condensers for motive-power engines have been made by Mr. MARCHANT, of Kirby-street, Hatton Garden, who states his invention to consist in an improved method of applying that expression of heat which is due to the compression of steam or other vapour or gas to the manufacture of further steam, vapour, or gas from the saturating water or liquid supplied to such steam, vapour, or gas when under compression. Such improved method of application is based on his discovery of the law that any vapour or gas can be compressed without any thermometrical expression of the increased temperature due to its compression, if during such compression it be so saturated with a liquid that all the heat evolved by its compression shall be taken up by the liquid and expressed in vapour out of such saturating liquid. And that such process can be effected without destroying the elasticity of the steam or vapour.

In obtaining this result according to his method the whole operation is confined within pumps which are constructed for the purpose and which compress steam (or other vapour or gas) under water or liquid saturation, and supply, for example, the boiler of an engine with saturated steam. He constructs the pump, or the first pump of any series of pumps, of such capacity of pumping power as shall deliver the proportion of the exhaust steam which is to be compressed as steam with every revolution of the engine, and he makes the pump-rod or rods of this pump of tubes working through glands in the ordinary manner. He slots these tubes in such a manner as to connect them with thin copper or other compartments which are perforated or bored to receive the pipes, and in such manner as to put the interior of the compartment in communication with the interior of the tube. He then threads these compartments on the tubes, making the joints between them and at the ends by means of rubber washers which close up the slot to the tube, where it not in connection with the compartment.

When all the compartments are threaded on with alternate washers, the whole is screwed up tight by means of a back nut or other suitable contrivance at each end for the purpose. He keeps the ends of the tubes forming the pump-rods open to the atmosphere, and by means of these tubes conveys into the copper compartments external air saturated in its passage by water from the open end of one of these tubes. By such means he can regulate the condensation by giving a greater or less supply of water to the air, so as to make it either a good or inferior condensing medium, and he obtains an enormous condensing surface in a small space. He then delivers the steam charge for compression on the top of the water in the pumps, and the steam that he requires to be condensed into water (for the purpose of saturating such steam charge when under compression) below the top of the water in the pump, and in this water the copper compartments full of saturated air, and open by means of the tubes to the external atmosphere, are given a corresponding motion with the stroke of the pump, and the water for saturation is manufactured of the required proportion of the exhaust steam in the pump itself, and without necessity for any external condenser or other pumping arrangements. By such arrangement, therefore, the whole of the exhaust steam is condensed into the pump, the proportion to be compressed as steam is delivered forwards with the stroke of the pump, and the proportion that has to be condensed for the purpose of saturating the former charge is condensed in the pump itself, and the law before named, by which such process is effected, is applied in a complete and economical manner.

STEAM-BOILER MAKING APPARATUS.—The invention of Mr. G. FREDBOUF, of Tuppelle, near Liege, and Westminster, consists in apparatus for bending, shaping, or flanging metallic plates by hydraulic pressure, such plates to be used more especially in the manufacture of steam-boilers. These improvements are more particularly applicable to the manufacture of fire and smoke-box tube plates and similar uses; he is thereby enabled to flange any required shapes or sizes of such tube plates, and to produce the requisite moulds at less cost than heretofore. In the form of his plate-bending press he prefers to employ the main hydraulic plunger or ram works from below in a suitable cylinder fixed in a strong base plate, and the said ram is connected to a head plate guided up and down by columns carrying the top framing, fitted with a fixed head plate. To this head plate are suitably attached the improved dies, to be more particularly described further on. On the moveable head plate of the main flange are set supports for carrying a tubular or hollow matrix. This matrix is supplemented by an independent moveable bottom, carried by four, more or less, small independent plungers. The plate to be bent is held up against the fixed die at top by means of two small adjustable plungers acting directly or upon the moveable bottom of the matrix itself, impelled upwards by the main plunger flanges the outer edges as it passes up round the die. The cylinders of these small auxiliary plungers are not fixed to the main press cylinder, but are adjustable radially, the water under pressure being conveyed to them by means of adjustable flexible pipes. Further, in order to be able to give the plate to be shaped the full pressure, and to be able to shape all kinds of plates, the said auxiliary plungers can be keyed to the head plate of the main plunger, suitable slots for the purpose being formed in the said plungers. Instead of making the moulds for flanging or bending round the edges of the fire-box and smoke-box tube plates of locomotives, portable engines, and of similar parts of the boilers in one single casting, he makes them in two, three, or more separate pieces, bolted or otherwise held together. By these means he can adapt the separate pieces to a number of shapes and sizes as required, and is not obliged to make fresh castings for each class of work. When he uses a hydraulic press with the main plunger working overhead, he employs a number of small auxiliary plungers, as described, but with their cylinders adjustable on the bottom framing or base plate. As the main plunger descends the water is driven back out of the small cylinders.

IMPROVED CRUCIBLES.—The object of the invention of Mr. R. W. WALLACE, of the Chemical Works, Battersea Park, is to supply a want which has long been felt in the chemical trade—that is to say, to provide a substance capable of resisting the action of acids and other chemicals at a high temperature. This object is accomplished by the employment of plumbago instead of kaolin, which is at present used in the manufacture of porcelain, and by its combination with other ingredients described. In practice he first mixes ground plumbago in a solution of borax or other flux ordinarily used in pottery or similar work, thus forming a "slip." To this "slip" he adds an equal, or nearly equal, quantity by weight of ground felspar, ground Cornwall or china stone, or similar fusible mineral, and to this mixture he also adds German, Stourbridge, or other fire-clay in quantities proportionate to the degree of plasticity required in the compound, and thoroughly mix these ingredients in a pugging-mill for about five or six hours. The compound consisting of the plumbago, the fire-clay, and felspar, or equivalent material may be baked in open or muffle kilns, or in seggars similar to those now used in porcelain kilns. The temperature required is about the same as that employed in baking ordinary china ware, but may be indefinitely increased without damaging the compound. And if he adds sulphate of soda, or other suitable flux, it is possible to bake the materials at a lower temperature, which he considers advisable for retorts and other vessels used for manufacturing chemical products which are not subjected to very high temperatures. In the manufacture of crucibles for melting metals and for similar purposes he substitutes common silver sand, or pure ground silica, for the felspar or china-stone, the other materials remaining the same. This one of his improved compounds may be used for making bricks for decomposing furnaces, and when a cheaper brick is required ground coke or coke dust may be substituted for the plumbago. In order to improve the texture of the compound the biscuit may be dipped into slips of which the following may be ingredients—red-lead, calcined or uncalcined borax, ground glass, whiting, carbonate of baryta, china-clay, and various other materials used in glazing porcelain, combined in various proportions, and in cases where the surface is not required to be smooth it may be dipped in these slips in the first instance, and one baking will suffice.

BLAKE'S PATENT STEAM PUMP.

MORE THAN 10,000 IN USE.

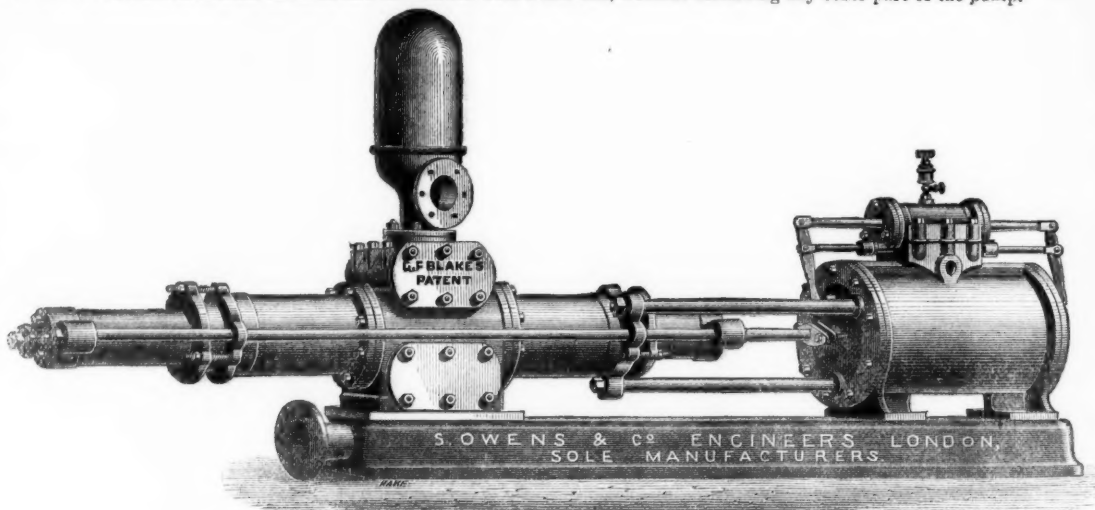
SOLE MAKERS FOR GREAT BRITAIN.

S. OWENS & CO.,

Hydraulic and General Engineers, Whitefriars-street, London;

And at 195, Buchanan-street, Glasgow (W. HUME, AGENT).

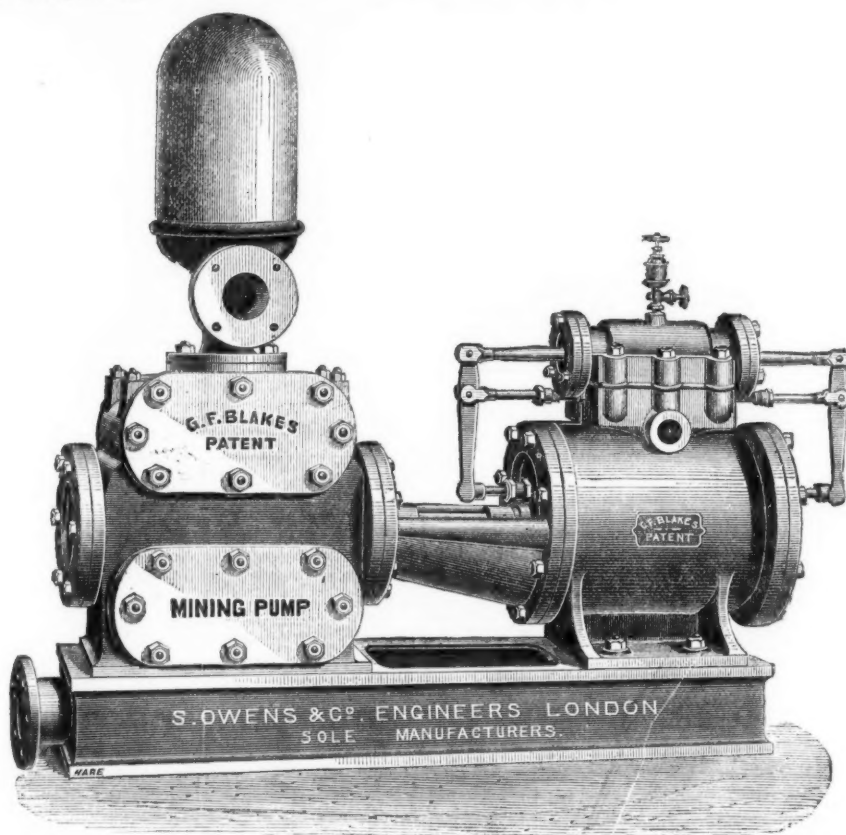
These PUMPS from their SIMPLICITY, RELIABILITY, DURABILITY, and ECONOMY are SPECIALLY SUITED FOR MINING PURPOSES, where large quantities of water require to be raised from great or medium depths with CERTAINTY. They are double-action in their construction, throwing a constant stream of water, can be made of any stroke to suit the space in which they have to work, can be arranged with any combination of steam and water cylinders to suit the pressure and lift against which it is desired to work them, are made of the very best materials and highest class of workmanship, and all working parts can be readily got at by any ordinary workman, and replaced if necessary by a duplicate part (all such being interchangeable) in the shortest possible time. For situations where gritty and sandy water has to be pumped the DOUBLE-PLUNGER PATTERN is recommended. Where space is limited the PISTON PUMP is better suited, a novel feature of which is the PATENT REMOVEABLE LINING, which can be removed in a few minutes and substituted with a new one, without disturbing any other part of the pump.



Blake's Improved Double-plunger Steam Pump.

S. OWENS AND CO.,

In placing the BLAKE STEAM PUMP before the mining world, believe they are offering the BEST, MOST RELIABLE, and ECONOMICAL PUMP that has yet been made, and solicit an inspection of various sizes in operation at their works, Whitefriars-street, Fleet-street, London.



Blake's Improved Mining Pump, with Patent Removeable Lining to Pump Cylinder,

Any combination of these Pumps may be had to suit circumstances. The following are some of the SIZES SUITABLE FOR MINING PURPOSES:—

Dia. of steam cylinders, In.	12	12	12	12	14	14	14	16	16	16	16	18	18	18	18	20	20	20	20	24	24
Dia. of water cylinders, In.	3	4	5	6	4	5	6	4	5	6	8	4	5	6	8	5	7	8	9	6	8
Length of stroke ... In.	18	18	18	24	24	24	24	24	24	24	24	24	30	30	30	30	30	36	36	36	42
No. of strokes per minute.	30	30	30	30	25	25	25	22	22	22	22	22	22	22	22	20	20	17	17	17	15
Quantity in gallons per hour, approximately ...	1440	2610	4200	5940	2940	4620	6600	2646	4158	5940	10620	2646	5160	7500	13260	4586	9000	12360	15660	6720	12000

PRICES FOR THE ABOVE, OR ANY SPECIAL SIZE, AND ILLUSTRATED CATALOGUES FURNISHED ON APPLICATION

PATENT CONDENSERS

Can be supplied for any size pump to effect a saving of fully 30 per cent. in the consumption of fuel, greatly increasing their efficiency

The Blake Pump will work under water, and as efficiently with compressed air as with steam.

BLAKE'S DONKEY PUMPS FOR FEEDING BOILERS KEPT IN STOCK.



PARIS EXHIBITION, 1867.



VIENNA EXHIBITION, 1873.



LONDON EXHIBITION, 1874.



CORNWALL POLYTECHNIC SOCIETY, 1867 and 1873.

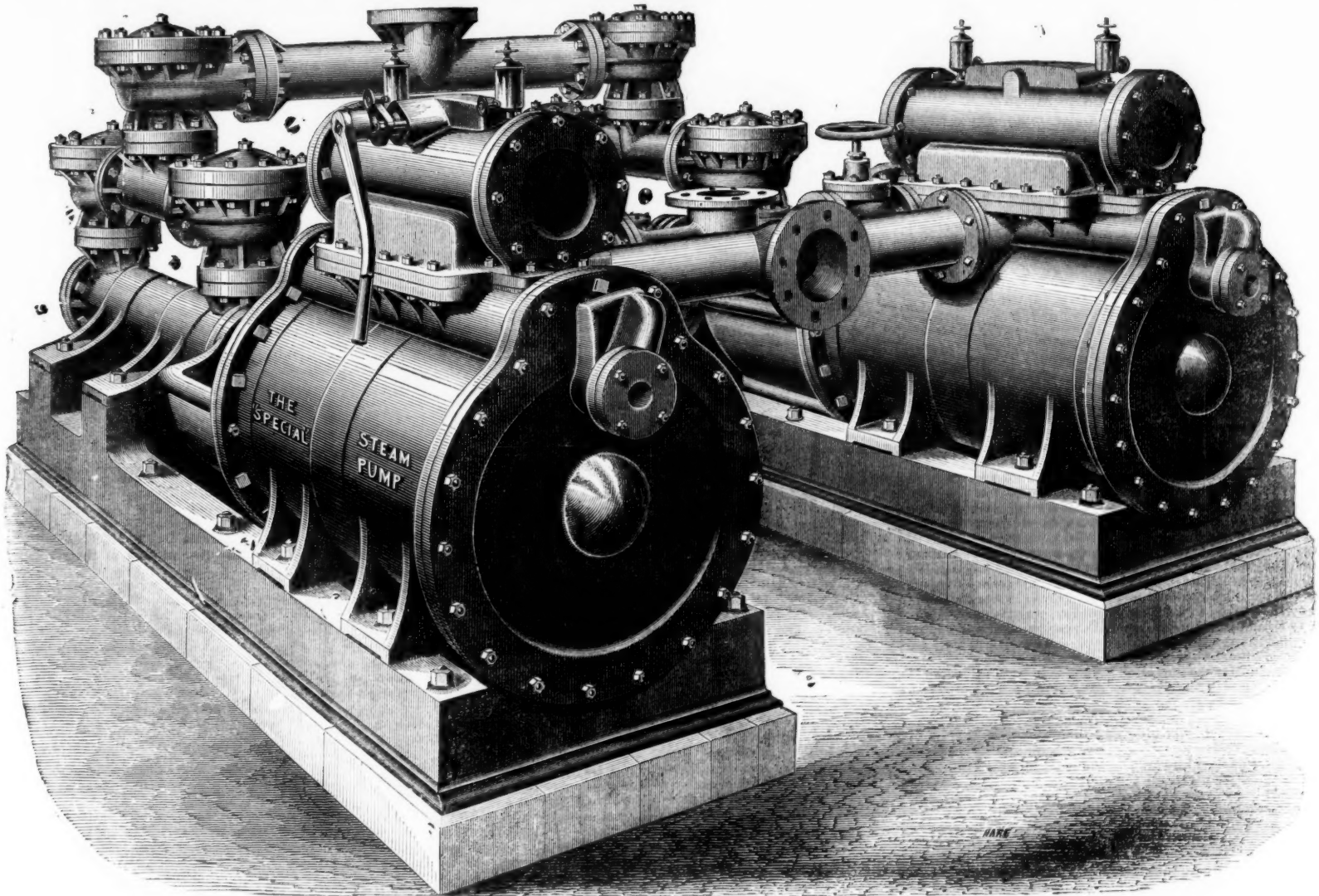
TANGYE BROTHERS AND HOLMAN,

10, LAURENCE POUNTNEY LANE, LONDON, E.C.,

AND BIRMINGHAM, (TANGYE BROTHERS), CORNWALL WORKS, SOHO.

THE "SPECIAL" DIRECT-ACTING STEAM PUMP. OVER 12,000 IN USE.

SUCCESSFULLY ADOPTED IN A LARGE NUMBER OF MINES IN THIS COUNTRY AND ABROAD.



PAIR OF THE "SPECIAL" DIRECT-ACTING STEAM PUMPS SUITABLE FOR HIGH LIFTS IN MINES, SIMILAR TO MANY SUPPLIED BY TANGYE BROTHERS AND HOLMAN.

The following extracts from a letter, received by Tangye Brothers and Holman, from J. Bigland, Esq., dated Feb. 25, 1875, refers to a "Special" Direct-acting Steam Pumping Engine supplied four years ago to Messrs. Joseph Pease and Partners, for the Adelaide Colliery, Bishop Auckland. The engine is throwing about 8000 gallons per hour, 1040 feet high, in one direct lift:—

"The underground pumping engine at Adelaide Colliery is working night and day. It does its work satisfactorily, and gives us very little trouble. Some of the cup leathers which form the plunger packing have worked three months. The working barrel is in beautiful condition. The average duration of the valve seats is about eight months; they work and keep tight as long as there is a bit of them left. I expect the valves (Holman's patent) and the buffers will last as long as the colliery."

Extract from a letter received by Tangye Brothers and Holman from W. H. Eagland, Esq., dated Feb. 27, 1875, in reference to a "Special" Direct-acting Steam Pumping Engine supplied two years ago to the West Yorkshire Iron and Coal Company near Leeds, to throw 16,000 gallons per hour, 465 feet high in one direct lift:—

"It is at work night and day. Our man goes down to the pump twice a day (Ten A.M. and Four P.M.), to supply the tallow cups. After this it is left every day till he comes next morning, when he goes down again at Ten A.M. as before. The only repairs the pump has had for 12 months are one bucket, which had worked since we got the pump, and one valve seat, but no valve, so it has cost very little. Its first lift is 70 yards perpendicular, then the water passes up pipes for half a mile, ascending another 70 yards, and then another perpendicular pipe of 15 yards—total, 55 yards vertical height."

Extract from the Official Report of the Commission of the German Empire on the Vienna Exhibition of the 1873, treating on Pumping Engines:—

"Contrary to these older pumping engines exhibited, there is now nearly everywhere the opinion established that the ('SPECIAL') pumping engines placed underground, which are made on A. S. Cameron's principle by Messrs. Tangye, are preferable to all. They do much duty combined with great compactness. They dispense entirely with the troublesome rod arrangement, giving often rise to stoppages, so that they will be applied shortly to a great extent, and are already in use in many localities. There is no doubt that this is in every respect practical system will command a general adaptation."

200 SIZES AND COMBINATIONS OF THESE PUMPS ARE NOW MADE.

The following are a few of the Sizes for High Lifts in Mines:—

Diameter of Steam Cylinder	In.	7	8	9	9	10	10	12	12	12	14	14	14	16	16	16	16	18	18	18	18	21	21	21
Ditto of Water Cylinder	In.	3	3	3	4	3	4	3	4	5	4	5	6	4	5	6	7	5	6	7	8	5	6	7
Length of stroke	In.	24	24	24	24	36	24	36	36	36	36	36	36	36	36	36	36	48	36	36	36	48	48	36
Gallons per hour approximate		1830	1830	1830	3250	1830	3250	1830	3250	5070	3250	5070	7330	3250	5070	7330	9750	5070	7330	9750	13,000	5070	7330	9750
Height in feet to which water can be raised with 40 lbs. pressure per sq. in. of steam or compressed air at pump		325	425	540	300	665	375	960	540	345	735	470	330	960	615	426	312	775	540	400	300	1058	740	540

CONTINUED.

Diameter of Steam Cylinder	In.	21	21	21	24	24	24	24	24	26	26	26	26	26	30	30	30	30	30	32	32	32	32	32
Ditto of Water Cylinder	In.	8	9	10	6	7	8	9	10	7	8	9	10	12	8	9	10	12	14	8	9	10	12	14
Length of stroke	In.	36	36	36	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
Gallons per hour approximate		13,000	16,519	20,000	7330	9750	13,000	16,519	20,000	9750	13,000	16,519	20,000	30,000	13,000	16,519	20,000	30,000	40,000	13,000	16,519	20,000	30,000	40,000
Height in feet to which water can be raised with 40 lbs. pressure per sq. in. of steam or compressed air at pump		413	326	264	960	700	540	427	345	827	633	500	405	282	840	665	540	375	275	960	758	625	426	313

PRICES OF THE ABOVE ON APPLICATION.—FOR SIZES AND PRICES OF PUMPS FOR LOWER LIFTS SEE SEPARATE LIST.

HOLMAN'S PATENT CONDENSER will be found a great acquisition to all kinds of Steam Pumps, as not only is the exhaust steam completely condensed, and the annoyance from same blowing off entirely got rid of, but a vacuum is obtained in the steam cylinder saving from 20 to 50 per cent. in fuel, and increasing to a considerable extent the economy and efficiency of the Pump

NORTH OF ENGLAND HOUSE ... TANGYE BROTHERS AND RAKE, ST. NICHOLAS BUILDINGS, NEWCASTLE-ON-TYNE.
SOUTH WALES HOUSE... TANGYE BROTHERS AND STEEL, Tredegar Place, NEWPORT, Mon.; and Oxford Buildings, SWANSEA.

PATENT IMPROVED ORE WASHING & DRESSING MACHINES.

THE SANDYCROFT FOUNDRY & ENGINE WORKS CO. (LIMITED), NEAR CHESTER

LATE THE MOLD FOUNDRY CO. (ESTABLISHED 1838).

SOLE MAKERS IN GREAT BRITAIN.

HUNDREDS IN USE.

FULL PARTICULARS,
PHOTOGRAPHS, TESTIMONIALS, AND PRICES,
UPON APPLICATION.

Will supply Designs, and all the necessary Plant for laying out
Dressing Floors; also

MANUFACTURERS OF EVERY VARIETY OF

MINING MACHINERY

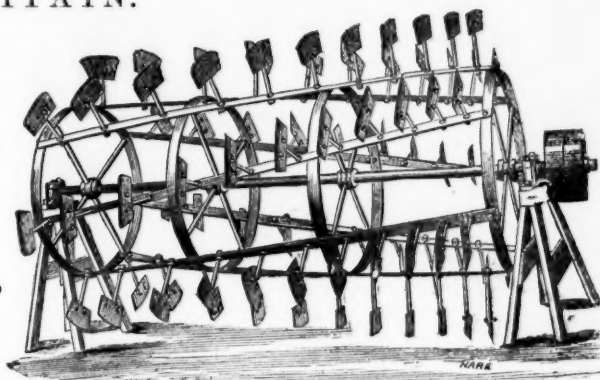
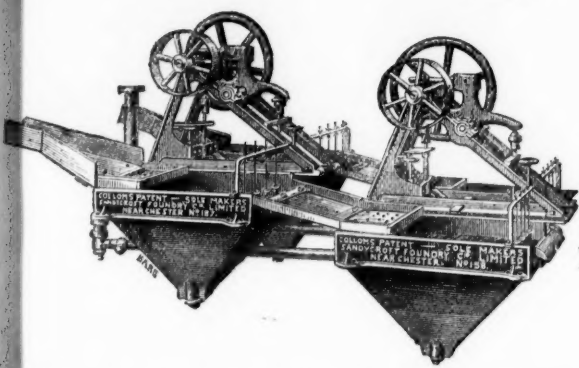
PUMPING & WINDING ENGINES,

PITWORK, CRUSHING MILLS,

ROLLS

OF PECULIARLY HARD AND TOUGH MIXTURE

&c., &c.

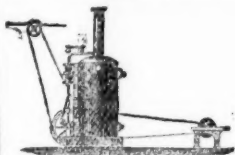


COLLON'S PATENT AUTOMATIC ORE WASHING MACHINE, working at the following and many other Lead, Copper, Blende, and Tin Mines:—Great L. Key, Cape Copper, Pontgibaud, Linares, Alamillos, West Tolgus, Lisburne, Minera Halvans, Snailbeach, &c.; and also at Messrs. Vivian and Sons' Works, Swansea.

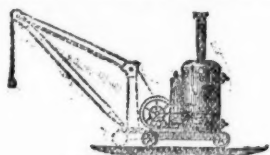
PATENT IMPELLER, OR KNIFE BUDDLE, in use at the following and many other Lead, Copper, Blende, and Tin Mines:—The Van, Roman Gravel, Tankerville, Ladywell, Lisburne, East Black Craig, Old Treburgett, Penhale & Barton, Bog, Linares, Fortuna, Alamillos, Minera Halvans, &c.

LONDON OFFICE: 6, QUEEN STREET PLACE, E.C.

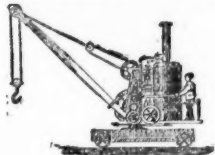
CHAPLIN'S PATENT PORTABLE STEAM ENGINES & BOILERS.



STATIONARY ENGINE.
No building required.



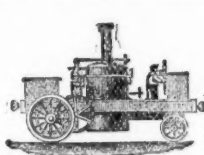
HOISTING ENGINE.
With or without Jib.



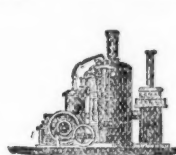
STEAM CRANE.
For Wharf or Rail.



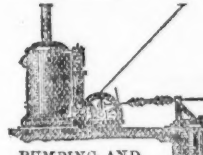
CONTRACTORS' LOCOMOTIVE.



TRACTION AND ROADWAY ENGINE.



SHIP'S ENGINE AND DISTILLER.



PUMPING AND WINDING ENGINE.

The ORIGINAL combined Vertical Engines and Boilers, introduced by Mr. CHAPLIN in 1855, specially designed and adapted for

Pumping, Winding, Hoisting, Sawing, Driving Machinery, and for General Contractors' Work, Railway Sidings, Coal Mines, Quarries, Gas Works, &c.

WIMSHURST, HOLICK, & CO., ENGINEERS, 34, WALBROOK, LONDON, E.C.

WORKS:—REGENT'S CANAL DOCK, 602, COMMERCIAL ROAD EAST, LONDON, E. (Near Stepney Station).

Parties are cautioned against using or purchasing Imitations or Infringements of these Patent Manufactures.

THE "CRANSTON" ROCK DRILL

SUITABLE FOR

QUARRYING, SINKING SHAFTS, SUBMARINE BLASTING, TUNNELLING, DRIVING ADITS,

Is the MOST SIMPLE and ECONOMICAL DRILL now in use.

BOILERS; AIR COMPRESSORS, worked by Hydraulic or Steam-power; STEEL for MINING DRILLS; PUMPING, and all other MINING MACHINERY supplied.

For Prices, Estimates, and other Particulars, apply to—

J. G. CRANSTON, 22, GREY STREET, NEWCASTLE-ON-TYNE.

Mr. Tait, Manager, East Hetton Quarry Company's Works, Coxhoe, Durham, writing on May 12, 1876, says—"I have pleasure in testifying to the value of your Rock Drills. The two you supplied us with about six months ago are giving us entire satisfaction. The cost of drilling by machine is less than ONE-FOURTH THAT OF DRILLING BY HAND. By the use of the Drills we have been able very greatly to increase the out-put of stone without increasing the number of men employed."

EMMET'S A1 PATENT BRICK MACHINE.

Massive; durable; cheap; takes little power, and gives PERFECT SATISFACTION.

This is the ONLY Machine which presses the Brick equally on BOTH sides, each plunger entering the mould plate $\frac{1}{8}$ in., and turning out 12,000 SQUARE, SOLID, PRESSED Bricks per day, READY AT ONCE FOR THE KILN.

SOLE MAKERS—

YEADON AND CO.,

CROWN POINT FOUNDRY, LEEDS.

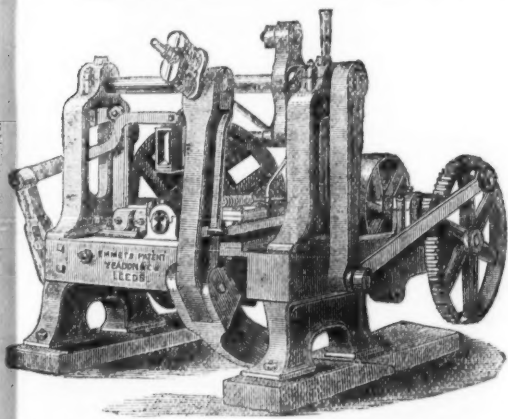
Makers of EVERY DESCRIPTION of Colliery and Brick Yard Plant.

LONDON AGENTS—

HAUGHTON AND CO., No. 122, CANNON STREET, E.C.

CONTINENTAL AGENTS—

PLAMBECK AND DARKIN, 171, QUEEN VICTORIA ST., E.C.



MINERS' LAMP

GAUZE MANUFACTORY,

Established Half-a-century.

JOSH. COOKE AND CO. SAFETY LAMPS

MADE TO DRAWING, DESCRIPTION, or MODEL. Illustrations Price Lists free, by post or otherwise.

VALUABLE TESTIMONIALS FROM EMINENT FIRMS.

MIDLAND DAVY LAMP WORKS,

BELMONT PASSAGE, LAWLEY STREET, BIRMINGHAM.



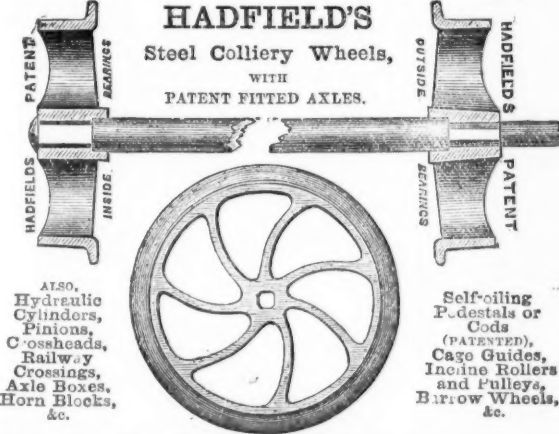
TO COLLIERY PROPRIETORS, MINING ENGINEERS, &c.

HADFIELD'S

Steel Colliery Wheels,

WITH

PATENT FITTED AXLES.



ALSO, Hydraulic Cylinders, Pinions, Crossheads, Railway Crossings, Axle Boxes, Horn Blocks, &c.

Self-oiling Pedestals or Codes (PATENTED), Cage Guides, Inclined Rollers and Pulleys, Barrow Wheels, &c.

Hadfield's Steel Foundry Company,

MANUFACTURERS OF EVERY DESCRIPTION OF

CRUCIBLE CAST STEEL CASTINGS.

ATTERCLIFFE, SHEFFIELD.

THOMAS TURTON AND SONS,

MANUFACTURERS OF

CAST STEEL for PUNCHES, TAPS, and DIES

TURNING TOOLS, CHISELS, &c.

CAST STEEL PISTON RODS, CRANK PINS, CONNECTING RODS, STRAIGHT and CRANK

AXLES, SHAFTS and

FORGINGS OF EVERY DESCRIPTION.

DOUBLE SHEAR STEEL, T. TURTON

BLISTER STEEL, EDGE TOOLS MARKED

SPRING STEEL, WM. GREAVES & SON

GERMAN STEEL, Locomotive Engine, Railway Carriage and Wagon

Springs and Buffers.

SHEAF WORKS AND SPRING WORKS, SHEFFIELD.

LONDON WAREHOUSE, 35, QUEEN STREET, CANNON STREET, CITY, E.C.

Where the largest stock of steel, files, tools, &c., may be selected from.

LA HOUILLE (Weekly Journal) represents the IRON and

COAL TRADES of FRANCE. Advertisements referring thereto, and sub-

scriptions, 20s. per annum, post paid, received by the London Agents, EDWARD

CASPER and Co., 40, Finsbury Circus, E.C.

Teams Patent Hemp and Wire Rope Works,

GATESHEAD-ON-TYNE.

DIXON, CORBITT, AND SPENCER.

MANUFACTURERS of every description of ROUND and FLAT ROPES of any length for COLLIERY, RAILWAY, AGRICULTURAL, SHIPPING, and other purposes, and guaranteed of the highest standard of strength.

Best Selected Charcoal Iron, Best Crucible Cast Steel, and extra strong Improved Steel Round and Flat Wire Ropes; Compound-laid non-rotating Flexible Ropes, in Iron or Steel for small gear and sinking purposes; Best Selected Charcoal Iron Guide Ropes; Galvanised and Plain Ropes for capstans, crabs, suspension bridges, canal towing, &c.; Patent Steel Plough Ropes; Galvanised Signal and Fencing Strands; Copper Rope Lightning Conductors; Steel, Iron, and Copper Ropes; Picture Cords; Russian, Italian, and Manila Hemp Round and Flat Ropes; White and Tarred Hemp and Flax Spun Yarns; Round and Flat Rope Pulleys and Patent Springs for same; Galvanised Wire Rope for Ships' Standing Rigging; Russian, Italian, Manila, and Coir Cordage; Towlines, Warps, Service and other Lines for Shipping Purposes; Ships' Rigging fitted by experienced workmen.

D., C., and S. beg to call special attention to the advantages to be derived by adopting their EXTRA STRONG IMPROVED STEEL ROPES, for lifting heavy loads in deep mines, also in hauling from long distances; a considerable reduction is effected in weight, friction materially reduced, and an extra amount of work got out of the rope—a rope 8 lbs. per fathom being equal in strength to an iron rope 20 lbs. per fathom, or an ordinary steel rope 12 lbs. per fathom.

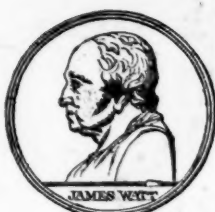
JEWELS, PLATE, AND VALUABLES

May be DEPOSITED for SAFE CUSTODY in the Fire and Burglar-proof Vaults of the

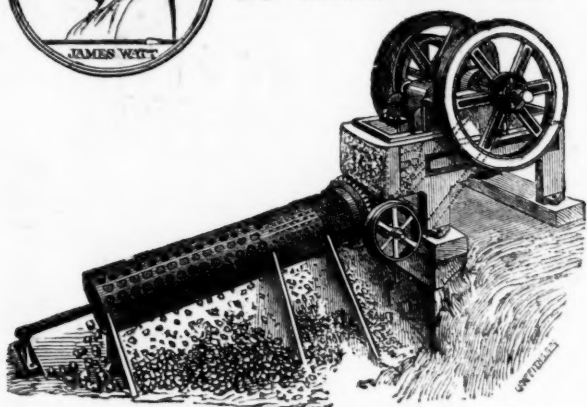
NATIONAL SAFE DEPOSIT COMPANY, LIMITED.

Apply to H. WEST, Esq., Manager, 1, Queen Victoria-street, Mansion House.

BUYERS are CAUTIONED against Purchasing any Infringements of H.R.M.'s Numerous PATENTS.



**Ore Crushers, H. R. M.'s
New Patent Crushing Jaw
EXTENSIVELY USED
BY MINE OWNERS.**



FIXED MACHINE AND SCREEN,
Specially designed and largely used for

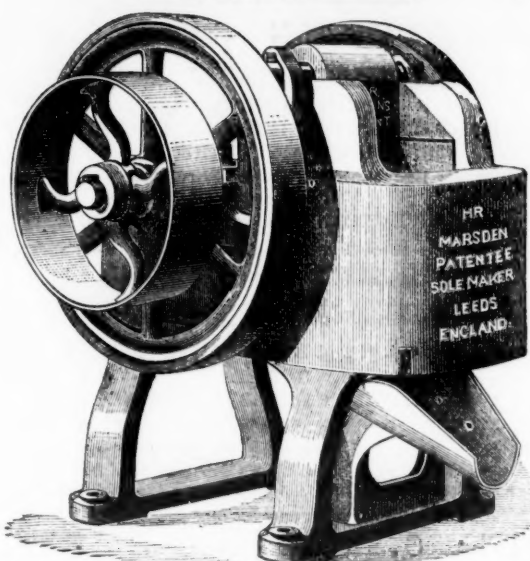
Crushing Pyrites, Limestone, Cement, Coal, Rocks, &c.,
AT ALL THE PRINCIPAL WORKS IN THE KINGDOM.

Takes in 20 in. by 9 in., and is shown by TESTIMONIALS to be
breaking from 1000 to 1200 tons per day of 10 hours, at
THREE HALF-PENCE PER TON.
FEW WORKING PARTS.
SMALL WEAR AND TEAR.
FREEDOM FROM BREAKAGE.

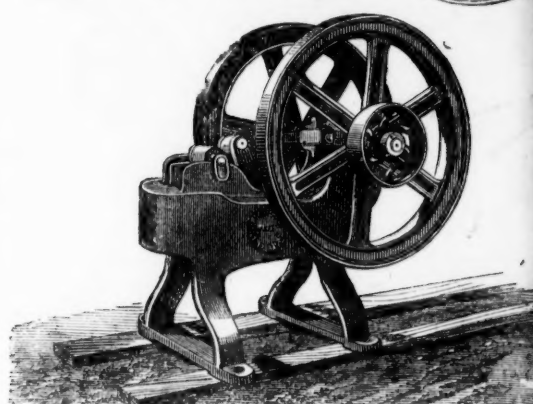
H. R. MARSDEN, LEEDS,
ENGINEER.

**Mining Improvements
Revolving Picking
Table.**

1150 NOW IN USE.



"The Machine is well designed, simple, but substantially made
and is capable of reducing any material to fine gravel, such as cop-
per ore, and is certainly preferable to the stamps in use for that
purpose."—*Mining Journal*.



MACHINE FOR HAND OR STEAM POWER.

For making gravel for gentlemen's walks in parks and gardens,
for grinding emery, flints, fossils, &c., for pulverising silver, copper
and other ores; also gold quartz, and especially useful to chemists
and metallurgists for sampling, as it is capable of pulverising
hardest material, and can be turned by one man with ease.

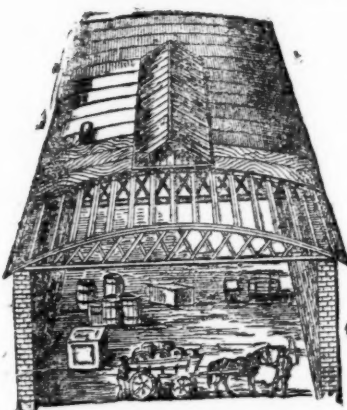
REFERENCES TO ALL PARTS OF THE WORLD.
SIMPLICITY OF CONSTRUCTION. EXCELLENCE OF SAMPLING.
ECONOMY OF POWER

THESE STONE BREAKERS AND ORE CRUSHERS ARE UNIVERSALLY PRONOUNCED THE ONLY PERFECT SUCCESS.

For Catalogues, Testimonials, &c., apply to the—

Sole Maker & Patentee, H. R. MARSDEN, SOHO FOUNDRY, LEEDS, ENGLAND

**M'TEAR AND CO.'S CIRCULAR
FELT ROOFING,**



FOR
GREAT ECONOMY
AND
CLEAR WIDE SPACE.
For particulars, estimates
and plans, address,—
M'TEAR & CO.,
ST. BENET CHAMBERS,
FENCHURCH STREET,
LONDON, E.C.;
4, PORTLAND STREET,
MANCHESTER;
OR
CORPORATION STREET,
BELFAST.

The above drawing shows the construction of this cheap and handsome roof, now
much used for covering factories, stores, sheds farm buildings, &c., the principal
of which are double bow and string girders of best pine timber, sheathed with 1/2 in.
boards, supported on the girders by purlins running longitudinally, the whole
being covered with patent waterproof roofing felt. These roofs so combine light-
ness with strength that they can be constructed up to 100 ft. span without centre
supports, thus not only affording a clear wide space, but effecting a great saving
both in the cost of roof and uprights.
They can be made with or without top-lights, ventilators, &c. Felt roofs of any
description executed in accordance with plans. Prices for plain roofs from 30s. to
60s. per square, according to span, size, and situation.
Manufacturers of PATENT FELTED SHEATHING, for covering ships' bot-
toms under copper or zinc.
DRY HAIR FELT, for deadening sound and for covering steam pipes, thereby
saving 25 per cent. in fuel by preventing the radiation of heat.
PATENT ASPHALT ROOFING FELT, price 1d. per square foot.
Wholesale buyers and exporters allowed liberal discounts.
PATENT ROOFING VARNISH, in boxes from 3 gallons to any quantity re-
quired 8d. per gallon.



By a special method of preparation, this leather is made solid, perfectly close to
texture, and impermeable to water; it has, therefore, all the qualifications essen-
tial for pump buckets, and is the most durable material of which they can be made.
It may be had of all dealers in leather, and of—

I. AND T. HEPBURN AND SONS,
TANNERS AND CURRIERS, LEATHER MILLBAND AND HOSE PIPE
MANUFACTURERS,
LONG LANE, SOUTH WARK, LONDON
Prize Medals, 1851, 1855, 1862, for
MILL BANDS, HOSE, AND LEATHER FOR MACHINERY PURPOSES.

THE GREAT ADVERTISING MEDIUM FOR WALES.
THE SOUTH WALES EVENING TELEGRAM
(DAILY), and
SOUTH WALES GAZETTE
(WEEKLY), established 1857,
the largest and most widely circulated papers in Monmouthshire and South Wales
CHIEF OFFICES—NEWPORT, MON.; and at CARDIFF.

The "Evening Telegram" is published daily, the first edition at Three P.M., the
second edition at Five P.M. On Friday, the "Telegram" is combined with the
South Wales Weekly Gazette, and advertisements ordered for not less than six
consecutive insertions will be inserted at a uniform charge in both papers.
P. O. O. and cheques payable to Henry Russell Evans, 14, Commercial-street
Newport, Monmouthshire.

**MINING PROSPECTUSES AND ANNOUNCEMENTS OF
PUBLIC COMPANIES** should be inserted in the BARNSTAPLE TIMES,
published every Tuesday, and in the DEVON POST, published every Saturday, as
these papers circulate largely throughout Devon and Cornwall, where many thou-
sands of investors reside. Legal and Public Companies' advertisements, 8d. a line
each insertion; Trade and Auctions, 4d. a line; Wanted, &c., 20 words, 1s.
Published by J. B. JONES, Barnstaple-street, Barnstaple, Devon, to whom all orders
by post or telegraph should be sent.

BRYDON AND DAVIDSON'S ROCK DRILL

SELECTED BY THE BRITISH AND OTHER GOVERNMENTS.

Reduced prices of this Rock Drill (formerly called "Kainotomon"), Nos. 1 and 2, £32 and £34.
SUBJECT TO DISCOUNT.

IMPROVED AIR COMPRESSORS.

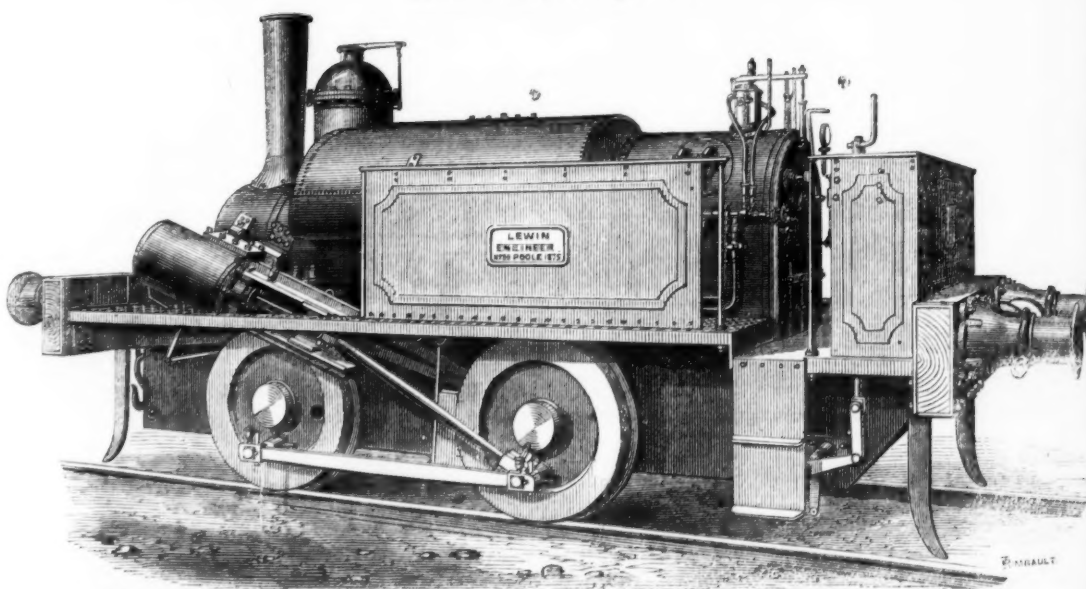
**Makers of Pumping and Winding Engines, Steam Hammers,
Boilers, Pump Pipes, &c., &c. Castings of all kinds.**

**BRYDON AND DAVIDSON, ENGINEERS,
WHITEHAVEN.**

LEWIN, POOLE, DORSET.

**Speciality in cheap colliery and contractors' Locomotives, and
very small Locomotives for replacing Horses.**

Prices from £300 upwards.



**PORTABLE FIXED AND VERTICAL ENGINES
WINDING AND PUMPING GEAR.**

The above represents LEWIN'S 10 by 18 DIRECT-ACTING LOCOMOTIVE, taken from a photo of one on a 4 ft. 8 1/2 in. gauge.

**STREET AND ROAD TRAMWAY LOCOMOTIVES,
ON THE MOST IMPROVED PRINCIPLE.**